FOOD MANUFACTURE

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

Profit Margins Criticised

THE profit margins earned by flour millers and cold stores under the Ministry of Food control schemes are criticised in the Second Report from the Committee of Public Accounts.

Under an arrangement with the flour-milling industry the Ministry undertook to reimburse the millers for all expenses incurred in milling and to pay to a Pool Company, for apportioning among the millers, a sum by way of profit at a rate per sack equivalent to the pre-war rate of profit, subject to the total profit of the industry being limited to the total pre-war profit. According to figures supplied to the Committee by accountants of the milling industry, the return on capital earned by millers is estimated at about 13 per cent. This figure excludes the Co-operative Wholesale Society, whose output is about one-fifth of the total and whose accounts show a higher percentage because of special circumstances. The report states that the Treasury reached the conclusion that the figures were not so high as to make it necessary for them to urge the Ministry to revise the whole basis on which food trades had been dealt with under control schemes.

The Committee emphasise that the return on capital is higher than the standard aimed at for Government costed contracts, but that the turnover of the industry is above the pre-war level; and "on the whole they do not wish to dissent from the conclusion reached by the Treasury." The Ministry has not sought the collaboration of the millers themselves in an effort to find a more economic system of control, but prospects of a successful solution are stated to be "not very good."

In the case of the control of cold stores, a financial arrangement based on maximum and minimum revenues, according to the size of the stores, was introduced. The Committee report that an investigation by the Costings Division of the Ministry of Food into the accounts of 24 undertakings out of a total of 367 showed an average return on capital of 15·87 per cent. in the first year of control and 15·80 per cent. in the second year. The Ministry did not consider these undertakings to be entirely representative and estimated the average return on capital throughout the industry to be between 11 and 12 per cent. The corresponding figure before

the war was estimated at 6·85 per cent. The Ministry attributed the increase to the fact that under war conditions the stores are filled to capacity, whereas the industry was in a depressed condition before the war. The Committee feel, however, that the rate of increase is "more than is reasonable," and they express the hope that the Ministry, in consultation with the Treasury, will find it possible to effect some reduction.

Fife Beet Growing Experiments

Beet growers from all over Scotland were present in great force in Fife recently when the British Sugar Corporation held a demonstration-lecture on various experiments conducted this year. The main points of interest in this year's tests were the experiments in the segmentation of seed and in the application of borax to the soil.

Beechgrove Farm, Cupar, farmed by Mr. James Murray, where manurial experiments had been tried in conjunction with Rothamsted Experimental Station, Harpenden, was first visited, and here Mr. John M'Cloy, manager, Prestonhill Sugar Factory, Cupar, pointed out the results of the segmentation of seed.

One benefit, he said, was that a good single plant came up instead of three or four of one root, which germinated well. At least 60 per cent. had come up a single plant. Singling was made much easier as a result of this segmentation, and plants suffered less from having no check by singling, and there were not so many bolters.

It has also been found, Mr. M'Cloy added, that there was a good deal less bolters when beet was planted on the flat than when planted on a ridge. In the trial field 0·25 per cent. bolters were present, whereas in the main group they were 4 per cent. Plant population on the segmented seed was 77 per cent.

A visit was then paid to a farm at Springfield run by the Fife Joint Asylum Board, where seed variety trials had been carried out by the National Institute of Agricultural Botany, Cambridge.

Mr. E. G. Thompson, representing the Institute, said that it would be noticed that three strains—British Hilleshog, Continental Hilleshog, and Johnston's Perfection E—were definitely smaller than the other varieties, but these three strains had a higher sugar percentage in the roots, though not necessarily in the acres, than the others.

The last visit was to Mr. Charles A. Rogers' farm at Prestonhall, where, in addition to the catchpole beet harvester, which lifts, tops, and deposits the beet in bundles, and an elevator in action, other experiments were examined. Mr. M'Cloy said that the conclusion that could be reached from this field was that it is definitely not advisable to sow till May is past. April is undoubtedly the best time to sow beet, and the middle of the month the safest time.

Studies of Edible Oil Oxidation

The ability of bacteria to oxidise triglycerides has been known for more than forty years, but the procedures for the detection of oxidative changes have been laborious and not very reliable. J. O. Mundt and F. W. Fabian (*J. Bact.*, Vol. 48, 1944, pp. 1-11) have made a study of the bacterial oxidation of maize oil, using the Warburg apparatus. This apparatus has many applications and is chiefly used in biochemical research; it is not as well known to control chemists as it deserves to be. It is a dependable and time-saving instrument for determining the ability of bacteria to take up oxygen in the presence of fats and oils, and in the hands of these authors has yielded information not made available by previous cultural or chemical tests. Of the 32 cultures of common soil and water bacteria, 25 showed an increased rate of utilisation of oxygen in presence of maize oil, and only 6 evinced the ability to dehydrogenate the oil. Two anti-oxidants (hydroquinone and Avenex) were unable to prevent bacterial respiration in presence of the oil in the concentrations at which they were used, and the latter compound was utilised by four of the five species of bacteria tested in its presence.

Standardisation of Dairy Equipment

A special committee appointed by the Society of Dairy Technology has been exploring for more than a year the practicability of standardising plant and equipment used in the dairy industry. A report presented by this committee at the annual meeting of the Society shows that much progress has been made and some important decisions have been taken. The task, however, is colossal, and a great deal still remains to be done. The committee considered that the logical procedure would be to begin with the distributor's end of the equipment chain and then work back via bottle fillers and washers, heat-treatment plants, instruments, and so on to the producer's end of the chain. This plan was approved, and the Council decided to give first priority to bottles.

The committee believes that the present complexity of shapes, sizes and types of bottles is uneconomic to the manufacturers of bottles, closures, washing plants and fillers, as well as to the users of all such equipment, and that a smaller range of standard size bottles would be of considerable advantage. There is a strong feeling in the trade that the success or failure of the attempt to introduce standardisation throughout the whole range of milk equipment may be measured very largely on the results in regard to bottles. The standardisation committee has reached the conclusion that "a type of closure covering the mouth of the bottle has become almost essential." The Council of the Society has asked the British Standards Institution to appoint a specialist sub-committee to pursue

the question of standard milk bottles in greater detail.

The Dairy Engineers' Association, in reply to an inquiry by the standardisation committee, has suggested that pasteurisation units, bottle washers, bottle fillers and milk pumps might be standardised in regard to their hourly capacities, but that no attempt should be made *by the dairy industry* to standardise V belts.

The British Standards Institution asked the Society's standardisation committee to take up the question of sterilisation boilers. A preliminary survey has been compiled and evidence is now being taken. In regard to milk churns, the committee understands that agreement has been reached among the principal manufacturers to follow the general design of the mushroom type of lid, and that there is a tendency for users of 12-gallon churns to change over to the 10-gallon size.

Availability of Vitamins

What seems to be a new line of enquiry has been started by Barnett Sure and L. Easterling, of the University of Arkansas. The results of the first part are reported in *Archives of Biochemistry*, Vol. 4, 1944, pp. 413-418, under the heading "Availability of vitamins in foods and food products. Utilisation of thiamin in brewers' yeasts." This is essentially akin to the question of the absorption and retention of proteins and minerals. The authors made thiamin balance studies with rats on three brands of brewers' yeast having potencies of 440, 670 and 160 micrograms of thiamin per gram. The daily dose of yeast supplied from 22 to 88 micrograms of thiamin, and excellent utilisation ranging between 93 and 100 per cent. was observed.

A comparison was made of absorption and utilisation of thiamin in brewers' yeast and that of pure crystalline thiamin. There was no difference in efficiency of utilisation, but there was from 6 to 11 per cent. poorer absorption of thiamin from one type of brewery yeast than from an equivalent intake of the pure vitamin.

Scots Milk Chiefs Object to False Optimism

The present unfounded optimism that the milk ration can be maintained even at 2 pints, the new figure announced in October, has been condemned by Scottish milkmen, who say that there is no more guarantee that this ration can be maintained than there was for the previous allowance of 2½ pints.

The retail trade in Scotland has made it clear that the new ration cannot be guaranteed and that it will be dependent entirely on deliveries. Actually there has been a steep decline in deliveries to retailers, the Scottish Milk Marketing Board having had to cut some retail shops by 25 to 30 per cent. This position is general in Glasgow, Edinburgh and elsewhere, and the assumption is that the problem will remain, even at the reduced rate, operating as from November 5.

Mr. Storrar, chairman of the Scottish Co-operative Milk Trade Association, is one official who takes a strong view on this matter, contending that the Food Ministry ought not to fix a rate of delivery which cannot be honoured in every section of the country. Rather than fix a rate which it is anticipated will not be supplied, the authorities should fix a lower rate or, alternatively, see that milk is brought in in sufficient volume to ensure that the amount required is there and that the promised ration is actually honoured.

He urges that retailers should be issued with evaporated milk to supplement any shortage of deliveries, and thinks that one tin per month would be adequate. Even the present allocation of 22,000 gallons daily from Ireland is not adequate to satisfy Scottish requirements, and Mr. Storrar contends that this should be increased or alternative types provided.

Much the same situation develops periodically in the delivery of coal, the customer getting his allocation in theory but often not in practice. The course of absolute honesty as to expected amounts of foodstuffs might, it is urged in Scotland, be considered more carefully, and a policy of delivering what is promised, and promising only what is deliverable, might be followed.

Spice of Life

The decision of Colonel Llewellin, Minister of Food, to authorise the importation of 100 tons of sage from Cyprus, 50 tons of thyme from Spain, and 25 tons of marjoram from Kenya is to be commended. For part of these aromatic herbs are to go to make sausages "taste more like what we got before the war." We have had the soya-containing sausage. And now that dish of Mr. Everyman —which threatened during the meat shortage to become an everyday one—is to be further improved by those old seasonings, by sage of Chaucer's "Knightes Tale," and old Father Thyme. When the historian of the future comes to record the actions and reactions of the British people in wartime, he cannot ignore the question of those foods which sustained them when the U-boats did their worst. In the past he has not deigned to include the sausage. To search the classic of Sir Jack Drummond is to find references to *Saussure* but none to "sausage." Indeed, despite the popularity of this common standby, the only direction in which the sausage receives publicity is on the music-hall stage, where it is the target of the professional jester.

So let us praise this form of nutrient which Shakespeare failed to put in the mouth of his Falstaff, which in the United States stretches to a hundred varieties. It first popped up in man's scribblings when Athenæus in 228 A.D. referred to

it in his Deipnosophists—a reference going back to 500 B.C., let it be noted. Next Aristophanes in the "Clouds" of 423 B.C. cries: "Let them make sausages of me and serve me up to the students." Much later Charles Lamb salutes the sausage as "the savouriest part, you may believe, of the entertainment of the chimney-sweeps' feast." With such an opening perhaps one day some inspired author will survey every aspect of this dish. He will tell of Frankfurters and Hamburgers; of *boudins blancs* of minced chicken, egg yolk, onions, salt and spices, which the French make (or made) as contrast to *boudins noirs* or black puddings. He will praise the *salamis* of Italy and Hungary with their pork and beef reddened by wine; the saveloys, the *mortadellas* of Bologna derived from chestnut-fed pigs. There will be told how Bologna became "polony"; how Sheffield won such a name for sausage-making as it did with snuff-making. Oxford sausages, the decline of which the late Professor Saintsbury so lamented, will be included to further the British claim. But, above all, that inspired writer will have to pay tribute to the British wartime sausage, hardly so tasty as these Continental brothers, yet a foundation and relief from the harsh monotony and dullness of rationing, which again and again appeared on the table of British war-workers and sustained them when other proteins were in short supply.

Lard Stability

An appreciable increase in the stability of lard as measured by the active oxygen method may be effected by the addition of relatively small proportions (1 to 10 per cent.) of various vegetable oils, according to a report in *Oil and Soap* on a paper presented by R. W. Riemenschneider, J. Turer and Waldo C. Ault of the Eastern Regional Research Laboratory, U.S. Department of Agriculture, at the annual meeting of the American Oil Chemists Society, held recently.

The increase in stability accomplished in this manner seems to be intimately related to the tocopherol content of the added oils. Since the tocopherols function most efficiently at lower levels, and with decreasing efficiency at each successively higher level, the Department of Agriculture Chemists point out that it would seem possible to take advantage of a considerable part of the stabilising action of these compounds without adding the vegetable oils or fats in excessively large quantities.

Tocopherol added in this manner appears to be capable of acting co-operatively with other antioxidants, such as *d*-isoascorbyl palmitate and commercial lecithin.

Since the melting point of lard is lowered by addition of vegetable oils it is found necessary to compensate for this by incorporating lard flakes. The addition of these flakes increases lard stability.

Enteric and Cheese

Referring to a recent article by Campbell and Gibbard in the *Canadian Journal of Public Health*, a writer in the *Medical Press* suggests that as most of the outbreaks of cheese-borne enteric have occurred in the United States and Canada, and as much of our cheese comes from the New World, the possibility of a cheese-borne outbreak of typhoid should always be kept in mind.

As a source of infection in enteric cheese does not seem much to have been considered (states the writer), but there have been a number of outbreaks of typhoid in which cheese was clearly indicated as the responsible factor. Different types of cheese have conveyed the infection from time to time—full-cream in one instance, but for the most part the variety involved was cheese of the Cheddar type. The source of infection is raw milk, usually emanating from a farm at which a typhoid carrier is employed. Campbell and Gibbard have shown that the enteric organisms may survive in cheese for many months; in one case for very nearly a year. Several other samples showed the organism to be still viable for more than 300 days.

Christmas Oranges

Further orange supplies are coming. We hope they may be available during Christmas week, for to our children, as to the Chinese who first knew them, they are the "symbol of happiness" shining in their yellow jackets. From the dietician's point of view citrus fruits with their vitamins are the "kindly fruits of the earth," transported by our seamen at risk during the war so that the children may thrive. Pre-war years saw us accept them as everyday and commonplace. Yet how different is the tale of the orange from the "little red oranges the winter does not kill," or the "little oranges of Kuang Nan" which scented ladies' hands, to the *portyngales* of English banquets! Tu-fu, that Chinese poet so taken up with his own verse that he prescribed it for fever, long ago told of oranges. But come to Mr. Pepys and one realises how well established they became in our land. He refers to the "Physique Garden in St. James' Parke" to remind us how we tried but failed to cultivate the fruit on English orangeries. His purchase of four shillings' worth at sixpence each at Drury Lane recalls the wiles of the orange-sellers in the pit of that theatre. "Here which I never did before, I drank a glass, or a pint, I believe, at one draught, of the juice of oranges, of whole peel they make comfits"; such was his comment illustrating the coming of fruit drinks and of candied peel. As for the antiscorbutic properties of the orange, one has only to follow Captain Cook, or the ship doctor, John Woodall, praising them in *The Surgeon's Mate*, or to re-read James Lind's work on scurvy, to complete the picture of this symbol of happiness.

Milk and the Consumer

PART III

The final instalment of this series. Previous instalments were published in July and November.

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Quality Milk Production in Britain

THE drive for quality milk in this country has come from a few individuals like the late Stenhouse Williams and Wilfred Buckley, a few progressive producers and a few progressive buyers. The influence of the public and most of the big buyers and public health officials has, on the whole, been disappointing. A small percentage of farmers are producing milk of a quality that should not be tolerated, and conditions on some farms are lamentable. *One of the worst mistakes ever made in this country was to guarantee a market for any milk without a quality specification.*

Probably the best milk production centre in the country is that of Dr. Chalmers-Watson of Drem in East Lothian (Figs. 5—*see Part II*—and 6).

In this system milk is conveyed from the two 6-point Auto-Recorder machines in the lactory, through heat-

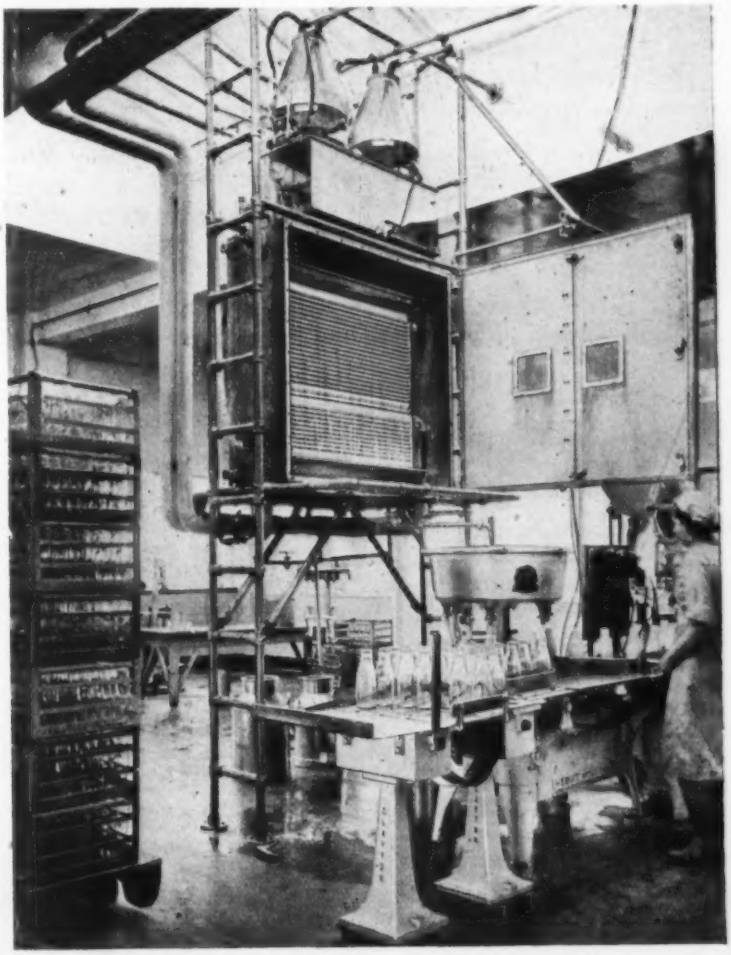

Fig. 6.—Ideal lay-out for dairy, showing cooler (enclosed) and bottling plant.

Courtesy of Dr. Chalmers-Watson and Messrs. Geo. H. Gascoigne Co., Ltd.

TABLE 13[8]

FREQUENCY OF USE OF MILK FOR VARIOUS PURPOSES

	Class AA. (Per Cent.)	*Class A. (Per Cent.)*	*Class B. (Per Cent.)*	*Class C. (Per Cent.)*	*Class D. (Per Cent.)*
Puddings	68·0	52·7	50·3	41·7	28·3
Custards	36·3	30·0	29·0	22·0	12·0
Cooking (cakes, etc.)	33·7	27·3	16·7	11·0	6·0
Food drinks	31·0	27·7	24 3	13·3	6·3
Breakfast cereals	52·7	42·3	48·7	40·3	26·0
Tea	97·3	97·3	97·0	90·7	72·0
Coffee	80·7	61·7	48·0	20·7	7·7
Cocoa	20·3	20·7	32·0	41·3	30·7
As a drink (fresh)	50·7	46·3	43·0	31·7	22·7

TABLE 14

COMPOSITION OF MILK OF VARIOUS MAMMALS (PER CENT.)

	Water.	*Casein.*	*Other Proteins.*	*Fat.*	*Sugar.*	*Ash.*
Human	87·5	0·9	1·2	3·7	6·5	0·25
Cow	87·3	3·0	0·4	3·75	4·75	0·75
Ass	89·7	0·75	1·2	1·5	6·2	0·4
Mare	90·0	1·3	0·75	1·2	6·2	0·4
Goat	87·0	3·2	0·7	4·2	3·9	0·8
Ewe	81·0	4·4	1·0	8·0	4·5	0·9
Cat	82·5	3·7	3·2	4·8	4·8	0·6
Dog	77·0	4·8	2·5	11·5	3·2	0·7
Reindeer	68·5	8·4	1·7	17·5	2·4	1·5
Elephant	67·8	3·09		19·6	3·1	0·65
Whale	48·7	7·1	—	43·7	—	0·45
Porpoise	41·1	11·2		48·5	1·3	0·55

resisting glass pipes and special strainers, to the dairy. Each Auto-Recorder machine has its own releaser, set high over the large cooler. The cooler is encased in a dust-proof cabinet, which acts as its own sterilising chest, and to which is connected a refrigerator. From the cooler the milk passes to an automatic capping and bottling machine, untouched by hand, and within a few minutes of leaving the cow.

Part of the yield undergoes ultra-violet ray treatment in a special room to which it is directed. Adjoining the dairy is a laboratory, where samples of milk are tested for bacteria and for butter-fat.

There is a glass observation room set above and between the lactory and dairy, from which the various operations of hygienic milk production can be observed.

Quality Milk in U.S.A.

The Walker-Gordon laboratories have been investigating problems concerned in the production of an

TABLE 15

CONSTITUENTS OF HUMAN AND BOVINE MILK: THEIR FUNCTION, DAILY REQUIREMENT AND STABILITY TO PASTEURISATION

(*Data from* [8, 9].)

Constituent.	*Human. (Per Pint.)*	*Bovine. (Per Pint.)*	*Function.*	*Daily Requirement of 6 Months Child.*	*Contribution of 1 Pint Cow's Milk. (Per Cent.)*	*Per Cent. Destruction by Pasteurisation.*
Casein (g.)	4·6	17	Body building	24	80	0
Albumin and globulin (g.)	2·3	2·3	Body building			0*
Fat (g.)	20·5	21·3	Energy†	—	—	0
Sugar (lactose) (g.)	37	27	Energy	—	—	0
Vitamin A (including carotene) (i.u.)	2000	850	Growth, resistance to infection, anti-night blindness	1500	57	0
Vitamin B_1 (aneurin) (mg.)	0·05	0·25	Anti-neuritic	0·4	63	10–20
Riboflavin (mg.)	—	0·85	Growth	0·6	100	0
Nicotinic acid (mg.)	—	1·13	Anti-pellagra	—	—	0
Vitamin C (mg.)	22·8	11·3	Anti-scurvy	30	38	10-50‡
Vitamin D (i.u.)	—	11·3	Anti-rachitic	—	—	0
Calcium (g.)	0·2	0·68	Bones and teeth building	1	68	0*
Phosphorus (g.)	0·1	0·57	Bones and teeth building	—	—	0*
Iron (mg.)	0·68	0·17	Blood forming	6	3	0
Copper (mg.)	0·34	0·085	Blood forming	—	—	0
Manganese (mg.)	—	0·025	Enzyme system	—	—	0
Iodine (mg.)	0·026	0·03	Thyroid activity	—	—	10–20
Calories	—	376	Energy	630	60	0

* 5 to 10 per cent. is rendered insoluble but is not destroyed.
† Fat contains some essential unsaturated fatty acids.
‡ Chiefly due to exposure to light, increased by copper and oxygen in the milk.

ideal milk for over forty years. The most spectacular feature is the Rotolactor, invented by H. W. Jeffers, which is a giant rotary milking unit 60 ft. in diameter, holding 50 cows and moving at the rate of 15 ft. a minute. On this 240 cows are washed, dried, disinfected and milked every hour—a complete herd of 1,680 cows in 7 hours. The Rotolactor is housed in a *lactorium* in which temperature and humidity are controlled. All workers are under medical supervision. Not only the milking but the feeding of the cows is scientifically studied and controlled in order to maintain the cows in health and enable them to produce a milk of high vitamin content. A typical daily ration is as follows:

Foodstuff.	Lb.	Specially Supplying.
Corn silage	24	Carbohydrate and protein
Lucerne	13	Carbohydrate and protein and vitamin A
Dehydrated lucerne hay	8·5	Carbohydrate and protein and vitamin A
Grain mixture ..	13	Carbohydrate and protein
Oats	2	Carbohydrate and protein
Bran	1·5	Carbohydrate and protein
Corn	1·5	Carbohydrate and protein
Barley	1·5	Carbohydrate and protein
Molasses	1·5	Carbohydrate
Babassa meal ..	1	
Linseed meal	1	Oils
Malt sprout	0·8	B vitamins
Gluten feed	0·5	
Distillers' grain ..	0·5	B vitamins
Brewers' grain ..	0·5	B vitamins
Soya bean meal ..	0·5	
Salt	0·2	
Irradiated yeast ..	0·2	Vitamin D
Minerals	0·1	

There are four Walker-Gordon certified milks—plain raw, pasteurised, vitamin D (containing at least 400 U.S.P. units per quart) and homogenised. The last is very easily digested on account of the small fat globules and low curd tension.

REFORMS AND IMPROVEMENTS IN THE DAIRY INDUSTRY

Quality Payment

Of all desirable reforms in the dairy industry it may be suggested that quality payment is the one most urgently needed. The idea is, of course, very old, and many schemes have been put forward, mostly based on fat percentages. It is interesting to note the change in attitude to this idea over the past four years. When a formula for basing payment on total solids content *and* bacteriological or keeping quality was put forward in 1940,[26] it was received with mixed feelings, among which scepticism was predominant. To-day the conception is discussed in dairying circles as though its acceptance is only a matter of time, and the term "quality payment" has even appeared in the producers' press.

Most commodities are bought on a quality basis, and there is no reason why milk should be an exception. The nutritive value of milk is in direct proportion to its total solids, and milk of good hygienic quality costs more to produce than dirty milk, which is the cause of endless trouble in the trade. The objects of quality payment should be (i) to raise the nutritive value of low-solids milk, (ii) to eliminate the 5 to 10 per cent. of very dirty milk, which is a constant menace to the keeping quality of the whole. As little as 0·1 per cent. of very dirty milk can sour a bulk of good keeping-quality milk (Table 17[27]).

On the assumption that the war in Europe will be over by January, 1945, we should be in a position to start a system of quality payment by January, 1946. Such a revolutionary change makes it imperative for dairy bacteriologists and chemists, and especially the advisers, to consider in great detail the fundamental principles on which such a scheme should be based and also the technical requirements.

The following cardinal principles are suggested as a basis for a scheme of quality payment:

(1) All producers must be included in the scheme.
(2) All testing, interpretation and calculations must be made by competent and unbiassed personnel.
(3) The cost of testing must be as low as possible.
(4) The basis of testing must be fair to the producer, distributor and consumer.
(5) Both chemical (or nutritive) and bacteriological (or keeping quality) aspects of milk must be taken into account in the scheme.
(6) All results should be made available to the producer as soon as possible.
(7) An adequate advisory service must be available to assist immediately any producer asking for help.
(8) Price differentiation must be sufficient to discourage strongly the production of bad milk and encourage the production of good milk.
(9) All milk must be bought by the Government and resold to distributors and manufacturers at rates dependent on the value of the milk for the particular purpose in view.

Formula for Payment.—If we accept the principle of payment being directly proportional to total solids and also weighted according to bacteriological quality, the following formula might serve the purpose.

$$\text{Price} = \text{basic index} \times \text{total solids \%} \times \left(\frac{\text{av. disc no.} + 24}{30}\right)$$

The disc no. used is the average of 6 results in the routine resazurin test.

However, the formula can be used for any bacteriological test—*e.g.*, the methylene blue test, the plate colony count or the direct microscopic count. For example, the formula could become

$$\text{Price} = \text{basic index} \times \text{total solids \%} \times \left(\frac{\text{MB reduction time}^* + 24}{30}\right)$$

or

$$\text{basic index} \times \text{total solids \%} \times \left(\frac{9 - \log \text{plate count}^\dagger + 24}{30}\right)$$

* Maximum value 6. Mean value for calculation of basic index = 4.

† Maximum value 9, minimum value 3. In practice a value lower than 3 would only rarely be obtained. Mean value for calculation of basic index = 5 (log 100,000).

These formulæ and values are only quoted as examples of the principle of the method and can be adapted according to requirements.

The introduction of a variable basic index is necessary in order to allow for the seasonal fluctuations in price.

TABLE 16.

AVERAGE COMPOSITION OF MILK OF FIVE BREEDS OF COWS.

Breed.	*Water.* (*Per Cent.*)	*Total Solids.* (*Per Cent.*)	*Fat.* (*Per Cent.*)	*Protein.* (*Per Cent.*)	*Lactose.* (*Per Cent.*)	*Ash.* (*Per Cent.*)
Guernsey ..	85·13	14·87	5·19	4·02	4·91	0·74
Jersey ..	85·31	14·69	5·18	3·86	4·94	0·70
Ayrshire ..	86·89	13·11	4·14	3·58	4·69	0·68
Friesian ..	87·50	12·50	3·55	3·42	4·86	0·68
Shorthorn ..	87·43	12·57	3·63	3·32	4·89	0·73

Calculation of Basic Index.—This is made by equating the formula for average quality milk to the current price level. For this purpose an average total solids of 12·5 per cent. and an average disc no. of 4 in the routine resazurin test[28, 29] may be used.

$$\text{Current price} = \text{basic index} \times 12{\cdot}5 \times \frac{28}{30}$$

so that

$$\text{basic index} = \frac{\text{current price}}{12{\cdot}5 \times \frac{28}{30}}$$

Calculation of Payment for Each Producer.—Knowing the basic index, which is the same for all producers for any one quarter, the payment may be calculated by (1) specially constructed tables, (2) a nomograph, (3) a specially constructed slide rule. A nomograph is easy to construct and can be used by anyone after a few minutes' instruction.

Methods of Increasing Production

Production may be increased by breeding more cows or better cows, or both. Parallel to this problem is that of feeding the cows; increased production will necessitate more good quality food. To obtain this we must feed more scientifically and economically, or improve the efficiency of our grasslands (since the acreage is obviously limited) or import more food from abroad. We shall probably see the greatest advances in the breeding of better cows, giving a higher yield of richer milk, and in the better utilisation of grasslands. Our best cows are several times as efficient as our worst. Probably the greatest advance ever made in scientific breeding is artificial insemination, which permits the fertilisation of large numbers of cows by a few first-class bulls of proved genetic quality.

The sire has an important effect on milk yield and fat percentage. Since a bull is not fit to serve until it is about eighteen months old and a heifer is not served until it is nearly two years old, it follows that the milk record of the daughters of a bull cannot be assessed until the bull is about six years old. Bulls of this age are sometimes beginning to get difficult to manage and may be too heavy to use for heifers, so that it may be necessary to keep two bulls—a young one to serve heifers and an older one to serve the bigger and stronger cows. Artificial insemination removes this difficulty and permits the use of bulls of proven quality for the insemination of heifers.

Production is also markedly affected by disease; it has been estimated that about one-third of our dairy cattle suffer from mastitis or disease of the udder to some extent. The average loss of yield is about 20 per cent., and the milk is of poor chemical quality. It is safe to say that because of this disease the farmer keeps five out of every hundred cows for nothing. It has also been estimated that the loss to the farming community through disease amounts to £30,000,000 annually. The National Veterinary Medical Association has sponsored a scheme whereby every farmer, for a moderate payment per cow, can receive up-to-date inspection, advice and treatment for his cattle. It is

TABLE 17.[27]

EFFECT OF 0·1 PER CENT. DIRTY MILK ON KEEPING QUALITY OF VARIOUS PRODUCERS' MILK, RAW AND PASTEURISED.

(*Times in min. to reach disc O in the resazurin test.**)

Producer.	*Raw*		*Pasteurised*	
	Milk Alone.	*Milk + 0·1% Dirty Milk.*	*Milk Alone.*	*Milk + 0·1% Dirty Milk.*
8	60	5	About 1,000	5
10	15	5	,,	10
12	15	10	About 500	10
22	15	5	About 1,000	5
23	60	5	,,	5
24	90	15	,,	10
25	15	5	,,	5
18	30	5	,,	5

All samples held at 18° C. for 13½ hours. The dirty milk was a composite of Category C milks 24 hours old.
* This is slightly longer than the methylene blue reduction time. The longer the time the higher is the quality of the milk.

obvious that such a scheme should be a national scheme sponsored by the Government.

Milk Recording.—This is simply a method of recording the yield of every cow, preferably at every milking (Fig. 7). At intervals an official visits the farm to check the record sheets and to sample for butter fat and sometimes other tests. To the business man this would seem an obvious thing to do, but only 15 per cent. of our cows are recorded at present. Naturally these cows belong to the most efficient and interested producers, and the average yield of "milk recorded" cows is 682 gallons a year, about 150 gallons higher than the average for non-recorded cows. If the production of the remaining 85 per cent. could be raised to this level, our total production would be raised by 375,000,000 gallons a year.

The Portable Bail or Open-Air System of Machine-Milking.—Increase in ley farming in recent years has seen a corresponding increase in "bailing." It improves soil fertility, and because the complete outfit—milking shed, dairy and machine-room—is taken to the cows in distant or off-lying pastures, they retain their healthy outdoor condition. In some districts, particularly Wiltshire, bailing is carried on all the year round. A modern milking bail, fitted with a 3-point Auto-Recorder machine, is capable of dealing with six cows at a time. The portable bail is useful as a means of increasing milk producton, where existing cowsheds are too small for the number of cows the land will carry, or of maintaining it where sheds are under repair. An improvement in the general health of the herd is observable when it is milked under these conditions. As the bail is moved to a fresh site each day, it can bring into cultivation land previously considered fit only for sparse hill grazing, because each site is manured and treaded directly. Bailing can provide the highest grade milk, under conditions as hygienic as other modern methods, because the milking-machine is identical with those used in fixed sheds.

The direct return of all dung and urine to the land is an important feature of the bail system. Modern sanitation and methods of sewage disposal have undoubtedly reduced the incidence of infectious disease, but have also resulted in a steady loss of manurial values. Of these calcium is not serious as lime is plentiful, and nitrogen can be replaced by the nitrogen-fixing bacteria. Humus and phosphate are important, however, and the potash question is one of marked significance. As an example of the loss of nitrogen, it may be pointed out that the urine of a family of four excreted in twenty-four hours contains sufficient nitrogen to form nearly half a hundredweight of potatoes.

Fuller Utilisation of the Land

Another aspect is the utilisation of pasture at present wasted—e.g., roadside verges, ground beside railways and land not at present utilised but which could be brought into productivity. Using a conservative estimate of 1 per cent. of our 40,000,000 acres for such land, it will be evident that this could support 150,000 cows supplying about 80,000,000 gallons of milk per annum. Where it is not practicable to keep a cow, the goat forms an excellent means of converting grass into milk. Goats' milk is somewhat richer than cows' milk, and is practically free from T.B. Milk and eggs are complementary foods, and it is safe to say that if every poor family could keep a goat and a few ducks or hens malnutrition in this country would disappear.

Fig. 7.—Auto-recorder milking machine.

Courtesy of R. A. Ward, Esq., and Messrs. Geb. H. Gascoigne Co., Ltd.

Dual Purpose Cows v. Dairy Breeds

Broadly speaking, there are two ways of producing milk—using a dual-purpose animal which produces less milk but has an appreciable meat value, or using dairy breeds which are more efficient milk producers but have no meat value. The Red Poll and dual-purpose Shorthorn are examples of the former, and the Ayrshire and Friesian may be considered examples of the purely dairy type. Many farmers are satisfied with a dual-purpose Shorthorn, which is not a highly efficient milk producer, because they can reckon on £15 to £25 when it is fattened off and sent to the butcher. On the other hand, an efficient dairy Shorthorn would show an extra return in milk equivalent to about £10 for each of, say, six lactations. The particular policy followed is naturally influenced by local conditions, but one aspect worthy of consideration is the possible increase in value of the "skin and bones animal" if we had an efficient and nationally organised system of utilising the carcass, especially where the glands are concerned. Thus a dead animal is not only a source of hide and bones, but also blood, fat, meat extract, and a whole battery of enzymes and hormones from the stomach, pancreas, gut and pituitary, thyroid, adrenal and suprarenal glands. Proper utilisation of these could considerably increase the few pounds which has been the market value of the dairy cow when its productive life is over.

Methods of Increasing Consumption

In the U.S.A. milk consumption is normally twice as high as it is here, and it is interesting to consider the reasons for this. They are:

(1) The *confidence* of the public in the safety of the milk supply. Tuberculosis is extremely rare and pasteurisation is compulsory in most cities and towns. Over 99 per cent. of the milk in towns of over 1,000 inhabitants comes from T.T. herds and 73 per cent. of it is pasteurised.

(2) *Palatability*. Milk is more pleasant to drink in America (so I am informed), and it is probable that the large proportion of Jerseys among the cows is responsible for this. The fat content and pigment of milk undoubtedly affect the appearance and feel in the mouth.

(3) *Availability*. Until the recent advent of the milk bar it was almost impossible to get an appetising milk drink in this country. In America not only is there a daily delivery, but milk can be obtained from the grocer, and every drug store has its milk bar. It is not surprising, therefore, that Americans have developed the milk-drinking habit. In England, if we want a glass of beer at five minutes to six we can normally get a glass of milk. If we feel like a glass at five minutes past six we can get a glass of beer! It is rather interesting to compare our milk- and beer-drinking habits. In the past we have spent much money on telling people to drink more milk—Nature's best food. The people responded to the extent of about £120,000,000. On the other hand, many well-meaning people have spent large sums of money telling people to keep "off the drink," and a wise Government has made it a crime to drink beer before 6 or after 10 p.m. The people responded to the extent of £320,000,000. It appears that if you want an Englishman to do anything, the last thing you must do is to tell him it is good for him; you must make it difficult, if possible illegal. The psychological aspects of drinking are a considerable factor in this problem. Four people are sitting in a bar when the barman announces, "Only five minutes left, gentlemen," and everyone immediately orders another pint. Why do they order another pint? Not because they really want it, but because they will not be able to get it in five minutes' time.

There can be no doubt that much unhappiness and crime can be directly traced to the excessive consumption of alcoholic liquors, and much malnutrition could have been avoided by an increased consumption of milk. Both these undesirable features could be avoided in the future if we remove the restrictions on the drinking of alcoholic liquors and increase the facilities for drinking milk, so that people do not drink the one for psychological reasons and are prevented from drinking the other for reasons of non-availability. In a free country we should be able to drink milk or beer at any time, according to the desire of the moment. The public-house, in the true sense of the term, has an enormous potential value as a social centre. We should replace the present type with its subtle attractions of restricted drinking by an always-open refreshment house where men, women and children could get not only food and drink in great variety but social amusement and entertainment. The experiment at present being carried out by Messrs. Tennant in Yorkshire is

ILLUSTRATING THE FACTORS WHICH MAKE UP THE CONSUMERS' PRICE OF LIQUID MILK FOR THE YEAR 1938

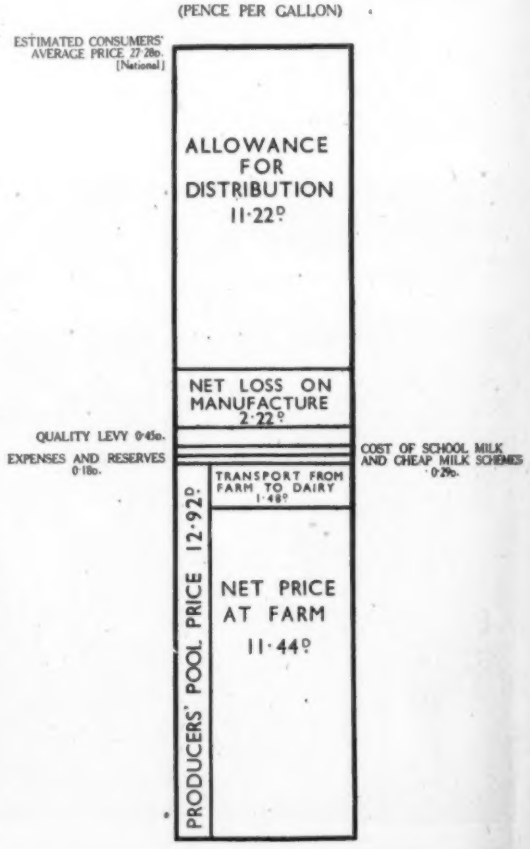
(PENCE PER GALLON)
ESTIMATED CONSUMERS' AVERAGE PRICE 27·28d. [National]
ALLOWANCE FOR DISTRIBUTION 11·22d.
NET LOSS ON MANUFACTURE 2·22d.
QUALITY LEVY 0·45d.
EXPENSES AND RESERVES 0·18d.
COST OF SCHOOL MILK AND CHEAP MILK SCHEMES 0·29d.
TRANSPORT FROM FARM TO DAIRY 1·48d.
PRODUCERS' POOL PRICE 12·92d.
NET PRICE AT FARM 11·44d.

Fig. 8.

Fig. 9.—Modern power churn-workers taking 300 to 500 gallons of 35 per cent. cream and producing 15 to 20 cwt. butter.

Courtesy of M.M.B. Creamery, Camborne, Cornwall.

proving very successful, and is being watched with great interest.

We could probably do more to increase the consumption of milk by making milk drinks available in grocers' stores, sweet shops and public-houses than by all the poster propaganda in the world. For young children other methods would obviously be necessary. Probably the simplest way of ensuring the adequate consumption of milk by children would be a family allowance in the form of vouchers for specified foodstuffs, of which milk and dairy products would be the chief.

Methods of Reducing the Price to the Consumer

The biggest proportions of the cost of milk are due to the cost of production and the cost of distribution, the cost of bulk transport and processing being relatively small (Fig. 8).[30]

We should always pay the highest possible price to the producer; the most fruitful field to explore for reducing the cost to the consumer is therefore in distribution. This can only be done by reducing the number of deliveries, or by selling milk powder through the grocer. It has been found at Reading that laboratory-pasteurised milk has extraordinarily long-keeping qualities at refrigerator temperatures (Table 18). It is not uncommon for such milk to remain sweet for a month.[31] One solution, therefore, when domestic refrigerators become universal, would be a once-weekly delivery of " in-bottle " or very efficiently pasteurised and bottled milk. *It might be said that quality payment, efficient pasteurisation of all milk except high grade T.T. milk, and universal domestic refrigeration are the three most urgently wanted reforms of the milk industry.*

Refrigeration on the Farm and at the Creamery

The two most important factors in clean milk production are (1) sterility and cleanliness of utensils, (2) adequate cooling. Many dairy farmers find it almost impossible to produce milk of good hygienic quality for lack of an adequate supply of clean water. In some dairying areas the water supply is a disgrace to the country. If all milk could be cooled to 45-50° F. within two hours of production the sour milk problem would virtually disappear. Individual farm refrigeration can only become an economic proposition if a mass-produced cheap standardised refrigerator becomes available, or alternatively we investigate the possibilities of a small collecting and cooling depot in each parish. Pending a national system of quality payment a great impetus to the proper cooling of milk could be effected by paying a premium of ½d. per gallon to all

TABLE 18.[31]

KEEPING QUALITIES IN DAYS OF RAW, COMMERCIALLY PASTEURISED AND LABORATORY PASTEURISED MILK AT 34° AND 45° F.

Treatment of Milk.	34° *F.*	45° *F.*
Raw	6 and 7	2 and 3
Commercially pasteurised	23 and 24	9 and 16
Laboratory pasteurised ..	46 and 65	32 and 32

producers utilising mechanical refrigeration to cool their milk to below 50° F. Further, since the cooling of milk at a parish cooling station would greatly simplify collection, a further premium of ½d. might be paid to all farmers delivering their milk to such a station.

Education and Practical Training for the Dairy Industry

The production, handling and processing of milk are essentially technical problems requiring an elementary but broad knowledge of physics, chemistry and bacteriology. It is obvious that the dairy industry will not attract our best scientific brains after the war in the face of competition from such fields as plastics, civil aviation, etc. Probably the most urgent requirement of the industry is a good stiffening of adaptable, scientifically trained young men and women of at least pass B.Sc. standard.

Creamery dairying will inevitably expand, and the industry will ultimately consist of producers (*i.e.*, farmers producing milk) and large-scale distributors and manufacturers. The latter will be responsible for making first quality cheese, butter (Fig. 9), condensed milk and dried milk or milk powder (Fig. 10). The manufacture of these products is essentially a technical process. The value of the milk involved is considerable—for example, a cheese factory with 10 vats of 1,000 gallons will handle 10,000 gallons of milk and make 10,000 lb. or about 4½ tons of cheese daily, the value being about £500. A fall in quality is of considerable economic importance, and all manufacture should be controlled by adequately trained and adequately experienced scientific staffs.

The need is not so much for more research as for the application of existing knowledge to dairying problems. To achieve this means, in effect, the appointment of scientific personnel to administrative and executive positions in all branches of the industry. Scientific improvements are usually taken up readily by the intelligent and progressive 20 or 30 per cent. of producers, manufacturers and distributors, but legislation is necessary to bring the most backward 5 or 10 per cent. into line.

Future of the Industry

The dairy industry is undoubtedly in the melting pot to-day, and many questions are eagerly discussed. Will the land be nationalised? Will a loan be floated to capitalise dairy farming adequately?[3] What will happen to dairy education, the agricultural colleges and the advisory services? Which Ministry should control milk? Should we have a comprehensive Milk Commission on the lines of a public utility company? Will all milk have to be pasteurised? Will the producer-retailer disappear? Will the small firms be swallowed by the big five? Will they in turn be taken over by the Government? Should milk be regarded as a national commodity like water?

It is evident that there are enough questions to keep Parliament busy for some time. The important thing is not the label under which a given activity is controlled, but the necessity of ensuring that all problems in the industry are tackled by those most competent to deal with them.

ACKNOWLEDGMENTS

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(*Continued on page 444*)

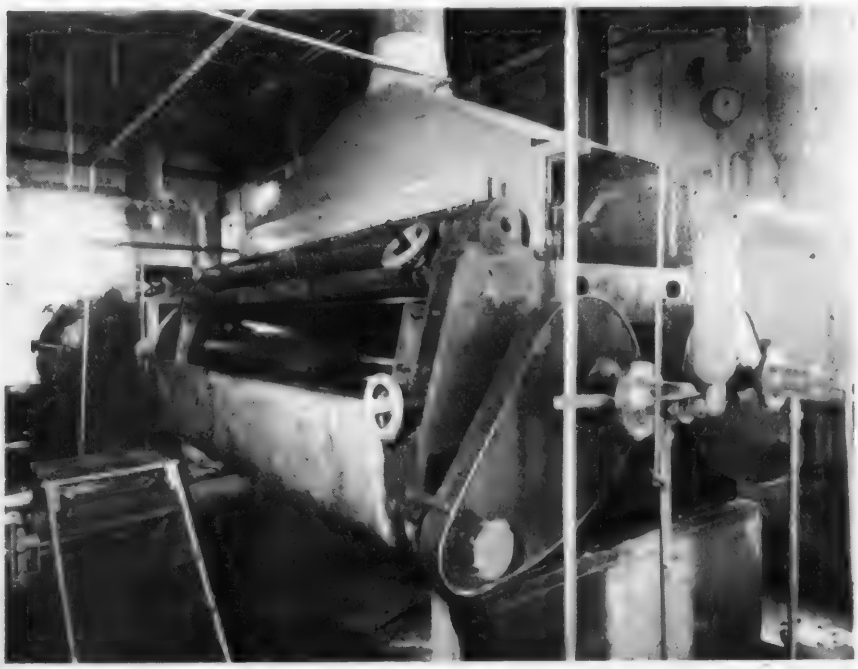

Fig. 10.—Roller drying plant for the manufacture of milk powder.

Courtesy of M.M.B. Creamery, Camborne, Cornwall.

Oatmeal Milling in Scotland

SPECIALLY CONTRIBUTED

FROM the earliest times oatmeal milling has been a particularly Scottish activity, due perhaps to the superior quality and output per acre of Scots-grown oats. This virtue of the Scottish soil and climate helped to influence the use of a cereal which grew so excellently, providing the Scot with his brose, porridge and bannocks.

During the war period the necessity for maximum home production has enabled oatmeal once again to appear daily on a fair percentage of British meal tables, and so to regain a popularity which it was losing pre-war to more novel, convenient or prepared cereals.

As a result of the exceptional demand for oatmeal many mills have resumed work or gained fresh impetus, and their output has materially assisted in increasing oatmeal production to at least 150 per cent. over the pre-war figures. Credit is due to Mr. Thomas Johnston, Secretary of State for Scotland, who has given notable aid to the industry, and the nation, in encouraging a national interest in oatmeal by school cooking contests, and to the oatmeal millers, large and small, who have all co-operated to ensure maximum production.

The burden of output has fallen mainly on the larger and more modern units in the industry, most of which are highly mechanised. Older mills relied on water power, but today many are electrically operated, fully mechanised, and extremely efficient in operation.

Milling Technique

The technique employed in a modern oatmeal mill adheres closely to the traditional procedure, but substitutes fast and efficient machinery for the slower mechanical equipment formerly used. The following processing procedure is that in general operation in modern oatmeal milling practice, varied by considerations of size, equipment and finance.

Mills were located, naturally, in oat-growing areas, and relied on local supplies until modern food distribution systems and the concentration of the population forced similar expansion of manufacturing; this led naturally to a shortage of oats in some areas and the necessity of drawing on distant growing districts to feed the expanding mills, and a reverse process operated in centres of declining population.

Transportation and Mechanisation

Having outgrown its original sources of raw material and the function of feeding local limited communities, the industry concentrated in the more populous areas, and now relies on transportation to serve these centralised plants. Mechanisation has involved a continuing flow of production, which makes a sufficient storage capacity the first essential to efficient production. Road and rail services are both used to maintain this flow of oats to the mills, although road transport is preferred by some millers as being more fluid; especially since the introduction of combined harvesters, as grain so cut and packed should be quickly processed to avoid any deterioration. Grain after stacking threshes out dry; combined harvesting, with all its advantages, leaves the oats rather less perfect.

Selection and Handling of Grain

The selection of grain, and the appraisal of its milling quality, is an art in itself, and only acquired by long experience. Samples are normally shown in the market, and grain is bought on the strength of these samples, it being the function of the management and merchant to ensure that the delivered grain is comparable with the sample in every way and acceptable to the miller.

Arrived at the mill, the oats are tipped from motor or waggon into an external hopper and passed over the grain cleaners, which remove all foreign seeds, sand and other extraneous matter. The grain then passes over a cockle machine, which removes the tiny black seeds, known to the miller as "cockles," and which but for this process would appear in the finished meal as objectionable, bitter, black foreign matter.

The oats are elevated to the silos by continuous bucket conveyers, which have an average handling capacity of 150 bags of 1½ cwt. per hour, in a modern plant, although in many of the smaller mills, less mechanised, this figure would be too high.

The silos are standard unit bins with varying capacities according to the firm concerned, 1,000 tons being a reasonable working volume in a big plant at the present rate of production; where a further reserve is thought essential, outside storage may be used to ensure a further safety margin. From the silos oats are lowered by totally enclosed conveyers to the ground level and again conveyed up into the kilns.

A steady flow is assured by feeding from the silos rather than from direct delivery tipping. Another cleaning process takes place at this stage, dust and impurities being extracted from the grain by dustreel machines, whose rotating perforated gauze cylinders eliminate dust and impurities before drying begins.

The modern kiln is some 30 ft. high, and any number of additional units can be operated to meet the output of the plant. Coal-fired furnaces drive hot air into the kilns through which the oats are gradually progressing, the drying process being automatically controlled throughout. Male labour is almost exclusively employed, and in the highly mechanised plants there is a relatively low personnel to output.

The dried grain is mechanically stirred from the bottom of the kiln through a perforated plate and fed into a conveyer, which again carries it to the storage bins. The subsequent operations are all designed to perfect and clean the grain against its final use.

From storage, after kilning, oats are conveyed to a grader and aspirator, which draws off the lighter oats and dust, and these are delivered separately to ground level.

The graded and dusted oats are then "hulled" between steel counter rotating discs (hullers), the modern equivalent of the traditional millstone. Oats are usually processed twice in these totally enclosed

machines, the bottom disc of which is stationary, while the upper runner revolves at controlled speeds, removing the husks from the oats. These husks are then sent to a duster, a machine with revolving steel beaters working in a wire cylinder, which loosens the husks and the rough dust, these being disposed of as a by-product. The groats—oats without husks—are then polished on a brushing machine, which removes any husks missed by the shealing operation; another aspiration follows to draw off dust, husks and impurities.

By this time the groats have become as clean as modern machinery can make them, and are ready for final processing. Polished, brushed and aspirated, they are fed in groat form, if intended as flaked oats, into a cutting machine, in which two steel drums grooved to the size of a groat carry millions of them over knives so placed as to slice them neatly in two. This makes "pinhead" meal, which is conveyed to a shaker, with a double, variable screen operating so that the very large and the very fine material run in different directions, leaving the bulk of properly sized pinheads ready for packing or processing.

In a modern plant the oats are seldom seen and never touched by human hand from beginning to end. During the entire process the material is enclosed and free from contamination, and the grain is so dusted, polished and aspirated as to ensure that it reaches its final condition as perfect as any food product can be. The considerable use of conveyers, which operate in piped sections, running through the mill from top flat to ground level, assures not only the purity of the product but the cleanliness of the mill. Power sources may vary, but electricity is in general use in the industry.

Independent motor operation can be used to control groups of conveyers or machine operations. Kilns are normally coal fired, but other types of heating are all possible.

Where the oats are for consumption in the traditional "oatmeal" form, the cutting process is eliminated and the oats passed through special millstones, so that varying grades of oatmeal are produced instead of the pinhead type already described.

A further development, and one which is likely to be increasingly popular, is the flaking of oats. In this process the pinhead meal is conveyed to the great steamer, passing through steam which part-cooks the grain, gravitating it then to a set of flake rollers, normally located immediately below the steamer.

This process produces the popular oat flakes, which are ready for packing after being cooled and dried.

Packaging Machines

The most modern mills have fully automatic packaging machines, some of American type, which take the pile of carton blanks, assemble them, convey them to the filling spout, automatically exert packing pressure, and complete filling, gum, seal, and deliver into a receiving point at which packing into delivery containers is completed.

But such elaborate facilities are for those mills which are operating on the largest scale and are not the general rule in the industry. In the greater number of instances weighing and packaging is still done by hand, although there is a growing interest in smaller packaging units which weigh and fill, leaving the final operations to be completed by hand.

Future policy in the industry must depend to a great degree on the extent of centralisation which can be achieved, or which may be thought desirable. It is perfectly obvious that a modern mill, designed and equipped on the most efficient mechanised lines, can adopt fully mechanised packaging, and will have the financial backing to encourage the use of such equipment.

There are many mills operating throughout Scotland and Ireland whose methods, in comparison with those of the more modern ones, might be regarded as crude, although the quality of the products turned out is satisfactory. The modernisation of these mills has been prevented by, among other things, the high cost of installing electricity in the country areas where they are situated.

A mill owner, anxious to electrify a mill at present operating on water, or oil-engine power, was normally faced with an impossible burden of cost in the installation of power, and more often than not has refused to consider electrification, and has preferred to rely on the cheapness and availability of water power.

There is, however, even in such country mills, which normally sell oatmeal to grocers by the bag, for subdivision on resale, a growing appreciation that packing will become necessary if they are to hold their own against the attractively packed goods produced by the big modern electrified mills. The prospect of a gradual but general tendency towards packed oatmeal, instead of bulk selling, must be expected, although it is evident that manual operation must still be largely used, for lack of alternative economical power, in the actual processes of packing.

The following is a brief description of the different items of plant and equipment used in oatmeal milling.

Conveyers

There are two main types of conveyers in use, both of which are already fully familiar to the food industry. Bucket-type elevators are used for upward elevation and worm-screw types for horizontal delivery. In a modern mill both are totally encased in sheet-metal casing.

Dusters and Hullers

Dusters are cone-shaped cylinders standing on a timber or metal framework, which allows the refuse to be bagged off below the actual machine. The rotation of the cone, driven either by belting or by direct power, drives off dust and foreign matter through the mesh of the cylinder. A typical machine has a capacity of 2,400 lb. per hour.

Machines which remove the husks from the oats are the hullers. These machines stand about 5 ft. high, are of metal, with enclosed metal discs, faced with emery composition. Grain is conveyed into the machine from the top end and delivered between the horizontal discs, the lower of which is stationary while the upper revolves at controlled speeds. Experience has shown that the largest percentage of hulled and the smallest proportion of broken or ended grain are obtained from mills using horizontal faces, and this type is now in general use. A handwheel is incorporated in the design so that the machine can be controlled by the miller from the mill floor, the tempering rod linking with the controlling internal driving

mechanism. A hopper, in the body of the machine, delivers the hulled grain into a conveyer. A typical machine can handle 60 bushels per hour.

Dressing and Grading Reels

These reels are used to grade or clean the oats. Like the dust reels, they feed into a hopper under the machine, which is a rotating cylinder, with mesh of varying type and with a capacity graded to meet the requirements of the particular mill.

Sizers

Sizers are another variation of the same theme. Grain is fed into the mouth on the upper end of the machine and into a rotating cylinder, about 30 inches in diameter. This cylinder has adjustable sections, so that the operator can alter the area of larger and finer mesh to secure the quantity of each grade required. The machine has removable doors fitted all round and a revolving brush operating against the cylinder to maintain a clean surface on the grading mesh.

Pinhead Cutter Machines

Pinhead cutting machines are of varying types, that already described having knives operating with grooved wheels, around which the oats run. In other types the cutting is done by interlocking teeth, which cut the grain as it passes between two rollers. Grain is again delivered at the top, distributed evenly by a feed roller and delivered again at either bagging or conveying level, at a top capacity of 1,500 lb. per hour.

One prominent firm of oatmeal millers have found that such a machine delivers 85 per cent. of finished pinhead, 12 per cent. of round or medium and 3 per cent. of fine meal, which must be regarded as a very satisfactory performance.

Grinding Mills

Where the meal is intended for use as oatmeal, as distinct from flaking, grinding is done in a normal type grinder. Feed is regulated by an improved type of shaking shoe, which has been found by oatmeal milling machinery experts to give the best results in practice, despite its simplicity, and a very high regularity of feed is both demanded and obtained.

The stones used in milling were formerly faced with French burr, but this has been largely unobtainable during the war period, and various types of artificial stones, incorporating burr, flint chips and other material, are now in use.

Where the mill is producing flaked oats—as so many now are—two essential machines are the steamer and the flaking rolls. Normally the steamer stands above the flaker, the process being a continuous one.

Oats all properly cleaned, sized, cut into pinheads, cleaned and sized again, pass into the steam cylinder and down through dry steam which thoroughly impregnates the pinheads, making them tough, so that when they are later conducted through the rollers they do not crack, are flat, and have no moisture. Steam pressure is from 10 to 15 lb. per square inch, and water resulting from condensation is separated and drawn off so that the grain never comes in contact with it. A shaker hung on steel springs and with an adjustable steel shute regulates the flow of the grain through the shaker.

Flaking Rolls

Grain, after passing through the steaming process, is normally delivered to the flaking rolls immediately below. The process is obviously an elementary one, the controlled method of feed ensuring that the cooked pinheads are distributed evenly over the special hard steel rollers, which are adjustable and controlled by hand wheels fitted with a locking device. An average capacity of 900 lb. per hour might be indicated as being obtained from such a rolling machine, the rolls measuring 24 by 15 inches.

Aspirators

Aspirators are used at various stages in the process of grain preparation. These machines are not unlike the old-fashioned threshing machine. Grain is fed into this machine and trickles down through a series of glass louvres, while suction from a fan located in the opposite end of the carriage draws off husks and other impurities, allowing the cleaned grain to trickle down to a discharge point below the point of entry. The husks and impurities are diverted to a worm conveyer along the bottom of the machine and discharged at the rear of the machine. Husks are a useful by-product, and are in some cases ground and used as cattle feed or in a wide variety of other uses. Such machines are available either in wood or steel.

Recent Trends

After the last war there was a boom and a subsequent slump in oatmeal milling, mill fitting and oatmeal consumption. Much the same trend has been noticeable on this occasion, with one important difference. New mills have not been required to any great degree nor have older mills, undergoing revival, been allowed any large volume of plant. The industry will finish this war, in general, without any large volume of surplus productive plant, as a result of the policy of limiting war-time output. There is, therefore, less possibility of any large-scale dumping of post-war plant and more hope that the units now in production will continue to operate fully, assuming that the encouragement given by present food policy persists.

There has been a very considerable expansion and an extension of working hours, of course, and a certain degree of refitting and replacing of plant, and this must be regarded as evidence of the present virility of the industry.

Irish millers are showing an interest in what they term "baby" flakes, a smaller flake than that generally made in Scotland. English millers are increasingly interested in oatmeal and flake production, and some fine mills are now in operation. Preference in England, and to a lesser extent in Ireland, is for pinhead meal. In Scotland, flaking is being increasingly adopted for packed selling, but the variety of types in popular demand vary so considerably as to make it difficult to decide in which direction demand is trending.

Stone-milled oats are used extensively for oatcake making, while fine meal is also popular for porridge. Oatflour from stone mills is being increasingly used as an ingredient of infants' food, making up into a most delicious jelly. Each mill has its own varieties and its own quality, each so characteristic of the region or the precise mill as to permit identification at once by the skilled miller.

Roaches in Food Factories

FREDERICK BURKE

ALMOST all food factories have a cockroach population. In spite of countless measures taken to combat these pests they still constitute a very great problem in factories where they find attractive food and favourable conditions of temperature and humidity.

Possible Disease Carriers

Apart from the " mental effect "—and this may be a very real thing to workers in badly infested factories—cockroaches by reason of their feeding habits have long been suspected, and in one or two cases incriminated, as carriers of disease germs.

Certain bacteria seem capable of passing through their digestive organs without being injured in any way. For instance, deadly germs of tuberculosis have been recovered from roach excreta and subsequently successfully employed to inoculate guinea-pigs with the disease. It is well known that roaches contaminate food with their excreta and render it unpalatable by a peculiar roachy odour, and it is possible that certain diseases are transmitted in this way.

Under suspicion as an agent in carrying certain forms of cancer, the cockroach has also been proved to act as a host to the parasitic nematode worm (*Gongylonema neoplasticum*), which, according to the authorities on the matter, sometimes appears to be a factor in causing stomach cancer in rats. One species of roach also is the secondary host of a proventricular worm (*Tetrameres americana*), which attacks chickens and turkeys. It may well be that the cockroach will eventually be proved to be as potent in the spread of human disease as the common housefly.

Life History

The cockroaches are insects of nocturnal habits, usually seeking the darkest corners during hours of daylight. They are essentially scavengers and feed on a diet of very mixed character, but showing a decided preference for starchy and sweet foods of all kinds.

Unlike most other insects infesting food factories, the female roach lays her eggs in a most curious manner. They are laid in a capsule or broodsac (technically known as oötheca), which she carries on the extremity of her body. These capsules, depending on the particular species, contain from 16 to 42 eggs, and are generally dropped in secluded spots near food supply. A number of capsules are thus deposited by a single female in the course of her lifetime. The young hatch from these capsules and reach maturity in six to eighteen months, depending on the abundance of food supply and the prevailing conditions of temperature and humidity.

Identifying the Roaches

Numerous different species of cockroaches have been recorded from time to time in Britain. The majority have been introduced into this country from abroad by commerce. Only a few species, however, have managed to establish themselves and breed here, having found the conditions admirably suited to their requirements. Of these, three are generally found in food factories and cause trouble.

The commonest is the *Blatta orientalis*; it is familiarly known as " the black beetle," although it is neither black nor a beetle. The adult insect is a reddish-brown colour, and about an inch long. The male has fully developed wings in the adult stage, but in the female they are of a rudimentary nature only. The original home of this species is not known for certain; its specific name, however, implies that it was most probably introduced into this country from the east.

Blattella germanica is the German roach; more usually known as the " steam fly," and often referred to in American literature as the " croton bug," because it was one of the first insects to appear in large numbers in the Croton Aqueduct, which supplies New York with water.

This insect is a light brown colour and about ⅝ inch long. It may be readily identified by the two darkish lines which it bears on the thorax and which are characteristic of the German roach. Both male and female insects possess fully developed wings. The young, however, do not have wings, and are normally darker in colour than their parents. *Blattella germanica* is commonly found, often in enormous numbers, in bakeries, food warehouses, and restaurants.

The American cockroach (*Periplaneta americana*) is the largest alien cockroach breeding in this country. It is very easily identified, for it measures from 1½ to 2 inches in length, and is of a rich brown colour. Both sexes are winged in the adult state. It occurs in bakehouses, breweries, sugar refineries, etc.

Control Problems

The control of roach infestations is an extremely difficult one and bristling with problems for the food manufacturer. Numerous preparations are now on the market for roach control, many of which are very good. They all, however, depend on the insects becoming contaminated in some way with the insecticide used. This is often a very difficult matter to achieve, for the insects are wary and shy, and frequently it is impossible to reach them. In highly infested factories permanent eradication is not possible, and the only thing to do is to keep numbers down to a minimum.

The use of toxic materials around food processing plants, and where food is present in large quantities, presents another problem to the manufacturer. For this reason a liquid insecticide is to be preferred to a powder preparation. There is less risk of food being contaminated by the use of a liquid medium than by fine powder, small quantities of which are readily carried by air currents. When liquid insecticide is employed it is important to spray into all cracks and crevices which are suspected of harbouring any insects. It is essential also to repeat the spraying at regular intervals.

(*Continued on page* 444)

The Balance Sheet of Europe's Food

Last month FOOD MANUFACTURE asked "How hungry is starving Europe?" This article is, in the author's words, "an expression of opinion as accurate as possible after weighing such information as appears obtainable."

F. LE GROS CLARK, M.A.

WRITING, appropriately enough no doubt, upon the eleventh day of November, I cannot predict what news we shall have from Europe before this paper is published. All I shall say is that *at the moment* neither the precise supply position nor the precise measure of need could be accurately defined. No one possesses the necessary data. There are three main factors in the situation and a number of subsidiary ones, that conspire to hold the Continent as in a miasma. Let me try to explain the problem with all its complexities.

Military Requirements still Dominant

Military requirements are still dominant on every one of the extended fields of operation. That is to say, the repair of rails and roads as well as that of rolling stock and bridges must subserve the military plans of campaign. The available shipping space has also to be allocated primarily in accord with military priorities. Moreover, the organisation of relief is still, in the west, a matter for the military authorities; and in Greece and Yugoslavia the representatives of UNRRA are only now being concentrated upon their future field of operations. The mission to Poland has yet to arrive at Lublin. Now, it is natural enough that the High Command in all the theatres of war, considerate as it may be in its dealings with the native population, is not anxious for a premature revelation of facts that might end in diverting transport from its main purpose of carrying war supplies. If the situation is accurately known or even guessed, it is not made public; and the Secretary of State for War, in answer to a Parliamentary question in mid-October, could do no more than protest that he was "endeavouring to obtain a general picture of conditions prevailing."

Dislocation of Transport

The dislocation of transport in most of the countries is of such an order that it is practically impossible to assemble the foodstuffs or shift them from the relatively surplus to the unquestionably deficit areas and to the industrial centres of population. That there *are* surpluses in certain areas is beyond doubt; but where they cannot be systematically assembled, no exact estimate of their extent can be made. In any one area they may be great or small. Moreover, the nature of the surplus varies, since several of the countries affected have for long been developing their agriculture on a pattern of complementary production. Italy is the obvious case in point. A local glut of vegetables, nuts or olive oil, for example, gives no evidence of the sufficiency to that area of its grain or sugar supply. The fact is that, while the land forces may have moved swiftly, both France and the low countries have been treated by the air strategy as a single extended battlefield, and that for several months past. The estimate of the proportion of French rolling stock temporarily or permanently out of commission varies between 60 and 70 per cent.; the number of bridges to be repaired has been given as approximately a thousand. The Dutch transport situation is obviously tragic, and is likely to remain so for an undefinable period of months. In Italy much damage was done to the rolling stock and the transverse railway tracks by the retreating Germans, the result being that, while the tracks leading northward along strategic lines of advance have to be repaired, communication between many of the inland producing areas and the populous coastal belt has been seriously interrupted. As for Greece, the Foreign Secretary testified recently, on his return from that country, that the disruption of rail communication by the Germans had been overwhelming. Since in Greece the normal surplus areas lie predominantly in the north, the rest of the country can with difficulty obtain even such poor resources as Thessaly and Macedonia might have to offer.

The "Black Market"

But when these two factors are combined with a complex and pervasive "black market," no estimate of the supply position is practicable. Food is retained on the farms, either because the peasant fears a shortage or because he hopes for a price rise; it vanishes in the secondary stage of the systematic traffic in food carried on by speculative dealers, professional or otherwise, who act as middle-men between the farms and the well-to-do purchaser; and, finally, the "black market" transactions have affected every family of the urban communities that can send one of its members walking or pedalling out to the villages in search of provender. It is a fantastically complicated picture. Values have changed too precipitately for the average citizen to adjust himself without an effort; he may one day be stealing a ration card or acquiring a joint of illicit meat for a comrade in hiding from the Gestapo, and on another he may be following the same course from greed or hunger or because he does not trust the ability of the Allied High Command to untie the knot, or for any other reason that prompts a man to traffic in the "market."

It is, of course, unreasonable to attempt to apportion blame. This is a social disease, bred in the pool of four years' degradation and struggle. The remedies are well recognised. The currency must be firmly stabilised and so directed as to bring patient pressure to bear upon the farming communities; at the same time supplies of food must be made available at the

ports with as high a degree of publicity as can be contrived. When the peasant sees that food is flowing into the market and that the currency is setting slowly against him, he has every incentive to unload his stocks; some appropriate penal measures should complete the work. The imported supplies need not be unnecessarily large; they should, of course, be suited to the ascertained need, but it is essential that they should be sufficient at least to impress the farmer with the sense that he has a competitor in the market. Beyond this we have to establish a sound control system, and until the rationing schemes can be developed we may have to arrange for direct distribution to families in certain areas. The "black market" habit is a most insidious one, and tends to re-emerge even when we believe we have checked it. Meanwhile drastic penalties have to be imposed for the more or less professional operators in the "market," so that the really serious mechanism for diverting food supplies is broken down and finally dispersed.

Unscientific Generalisations

There is an inclination in our own country to think of the peoples of France, say, or of Belgium as though they were one uniform substance. If that substance is not malnourished, then it must be uniformly well sustained. A generalisation of this nature is most unscientific. Clearly we are penetrating into communities with a very diverse social structure, where the distinctions between region and region and between income level and income level have been accentuated over a period of four years or more. These distinctions are necesarily reflected in the levels of food consumption, since there are few other ways in which they can be reflected. Any disturbance of transport will lead to extreme gluts of fruit, butter, olive oil or bacon in one area or another, particularly in areas that had been allocated under the German plan of production for the output of these commodities. The evidence of the troops or of journalists has here only the slightest claim to validity. The former are in no position and the latter in no mood to compare area with area or class with class. It is, for example, obvious to the sociologist that in such a community and at such a stage in its affairs relative luxury in one class might be combined with gross malnutrition among the debased 10 or 20 per cent. of the population.

The Moving Battleground

The war, let us remember, is not yet over; and where the war halts and a country becomes a battleground, the results are still unpredictable. Who would have foretold two months since that we might have to shift anything from one to two million men, women and children physically out of the Netherlands, if their lives are to be preserved? But such is the situation. The fate of the industrial populations of Italy, Austria and Czecho-Slovakia still hangs in the balance; and their fate will be conditioned by a complex formula, the factors in which are mainly the speed of the campaign, the intensity of the Allied bombing operations and the destructive capacity of the German armies. The time for casting up the balance-sheet of Europe's need has not yet come, simply because we lack the total figures, and those that are theoretically at our disposal have not yet been analysed.

Until teams of responsible and well-equipped medical men and research workers are on the spot, no evidence will be forthcoming upon which we can place any degree of reliance. Naturally the Governments of the various countries stake out a high claim for priority treatment; that is no more than human. But we shall have to assume that the agents of UNRRA will be men of international repute. The sooner they reach their field of operations the better; we shall otherwise be submerged in as great a confusion on the extent of need as we are on the supply situation. A few reliable records have reached this country; and these, though their sources cannot yet be revealed, indicate that in Italy at least, in Greece and among families evacuated from Dalmatia there exists clear evidence of impaired health, serious loss in weight and occasionally of frank starvation.

The Prospects

We may, however, attempt briefly to indicate the prospects. Supplies that are reaching Greece are not as yet large, though they may be just sufficient to meet the need of the towns; Greece was nevertheless in normal times a heavy importer of food, and the demand will here be necessarily sustained. According to some statements the quantity of food so far consigned to Yugoslavia is small or even negligible. Yet there can be little question that the population of this courageous country is in a state of serious deficiency. It is possible, of course, though so far the evidence is lacking, that the rapid movement of the war through Rumania and Bulgaria has left reserves of grain and other crops at the disposal of the Soviet authorities; and, if so, these stocks can be utilised in part for the supply of Yugoslavia and of Poland. It may, however, be anticipated that with the arrival of the UNRRA missions in the two liberated countries the Director of the Administration will be given an accurate picture of the needs and take the appropriate steps to meet them.

Scandinavian Countries

Norway is almost certain to be a deficit area, though the freeing of the seas for fishing should do much to relieve both that country and its neighbours. The harvest of the sea should at least be plentiful, though supplies of fuel may be required for the fleet, and we cannot at present predict how far German savagery will go; the impression from Soviet sources is that the liberated coastal belt of the far north had suffered considerably from *sabotage* by the time the Russians had gained possession of it. Danish production has been to some extent maintained as a base for German supplies of butter, bacon and cheese. The numbers of the dairy herds declined heavily during the first two years of occupation; but it is estimated by American writers that in the course of 1943 the cow population rose by about 18 per cent. Even then the output, which has probably not since been raised much higher, must be 20 per cent. below the pre-war level; and it seems possible that it had been maintained partly by the import of cattle feed from the Balkans. In that case the yield has certainly fallen by now below the level reached in the spring of 1944. Germany had herself apparently been relying for about 10 per cent. of her food and fodder supplies upon the Balkans and Hungary; and with her increased need for commercial alcohol she will

find it difficult enough to make up her own deficiency in home-grown food, let alone allocate supplies to Denmark.

The estimate of available overseas supplies suggests that, when transport is at our disposal, we can meet the Continent's grain requirements; but the main deficiency will be in protein foods and especially milk. Fats are likely to be very short; and the sugar situation depends in some measure on the extent to which the crop can be lifted and transported to the processing centres. Not to make too nice a calculation of it, the needs of at least a hundred million people have to be met either from their own soil or from overseas. Some 100 million lbs. of canned and salted fish is, it is understood, to be made available for relief; that would provide about 1 lb. a head. Allocations of meat might again allow of an apportionment of about 1 lb. per head among a population of this size. Evaporated milk does not appear to be very plentiful, though we are assured that dried skimmed milk can be supplied in a measure sufficient to the need.

We must, as scientists, suspend our judgment under compulsion; but we may, in the light of this evidence or lack of evidence, inquire how it happened that the statement could be authoritatively made in Parliament a month or so since that "we have been as strictly rationed as anyone during the war"? Strictly rationed we have been, beyond doubt; rationed to the verge of unending hunger we have not been. We must judge the fairness of a statement of this kind not by its formal phrasing but by the interpretation the public is likely to set upon it.

Disabled Persons (Employment) Act, 1944.

ALTHOUGH there are other provisions (vocational and rehabilitation courses), the most important for employers in the Disabled Persons (Employment) Act, 1944, is that which requires, when engaging new employees or re-engaging, that a percentage of the full number of employees is composed of registered disabled persons, called the Quota. But notwithstanding that an employer may be under his Quota and so ordinarily should engage disabled persons, he is quite in order in engaging a fit person, if he is required to engage a person under any statute (*e.g.*, reinstatement after service in the Forces, etc.), or by virtue of any agreement to reinstate a person made before the date of operation of the Quota provisions, and, moreover, a "permit" to engage a fit person may be obtained from the Ministry of Labour—*e.g.*, consideration to be given as to whether a suitable disabled person is available; whether the job is suitable for such; and so forth.

A point to note is that only registered disabled persons count for the Quota (registered with the Ministry of Labour) and both civilian and ex-Service people can register if they fulfil the necessary conditions; being registered "disabled person" give some assurance to an employer that the person registered is capable of entering into and keeping employment.

The Quota may include two sorts of percentages, the "standard" and a "special percentage," and where this applies the percentage will operate against the full number of employees engaged in the employments coming within the particular percentage. The "special percentage" will be used for employments which may be considered as having special characteristics, as regards suitability for disabled persons, and this may be either smaller or greater than the standard percentage, and so can be used for employments which may be considered as suitable and on the other hand for employments not so suitable; this percentage can apply to any (or part of any) trade or industry, or to any class of employer, and the Order assigning such a percentage must include particulars specially defining the trade, industry, class of employer, etc., and employments to which the percentage applies.

No percentage, however, will be fixed or any Designated Employment (see next succeeding paragraph) until the relevant organisations representing employers and employees have been consulted.

The Designated Employments mentioned are occupations considered as being specially suitable for disabled persons (*e.g.*, lift attendants) and these jobs will be specially designated by Order, the Act providing that only registered disabled persons can be employed in such occupations, although this obligation can be departed from in the excepted cases mentioned under the main Quota provisions; persons in these jobs do not count for the totals used in computing the ordinary Quotas.

If an employer considers that the Quota allotted to him is too high considering the particular characteristics of employment in his concern, he can apply (to the Ministry of Labour; note, this term, when used, really means through the Employment Exchanges) and if he satisfies the "powers that be" that his representation is well founded (the case is referred to a District Advisory Committee) a lower Quota may be allowed. Incidentally, there will be several District Advisory Committees throughout the country, with the National Advisory Council, whose duties will relate to matters concerning the training, employment, etc., of disabled persons.

Employers will be required to keep records concerning numbers, names, etc., of both fit and disabled persons.

All industries and all trades come under the Act, including public undertakings, so far as the total employees number twenty and upwards (a lower number may apply by Order); a point to note is that in all cases totals refer to the firm's employees, and not, if there are branches, to each particular branch, where the datum line of twenty may not be reached.

All the provisions of the Act will not come into operation simultaneously; the commencing dates will be issued through Orders in Council, and these can be different for different provisions of the Act.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in FOOD MANUFACTURE should not be taken as an indication that they are necessarily available for export.

Colour in Ice Cream

AN interesting article by Professor C. A. Iverson, published in the *Ice Cream Review*, emphasises the fact that colour is an important consideration in the preparation of any food material. Desirable colour increases the appeal of food products as it increases the anticipated pleasure of eating the products. Conversely, lack of colour appeal either through lack of colour, over colouring or an undesirable shade destroys the appeal to the eye which a food should have, and therefore detracts from its value.

Shade and Intensity of Colour

The shade of colour used and its intensity should harmonise with the product sold and the market for which it is intended. Shade and intensity should be differentiated for the purpose of this discussion. By shade is meant the colour—*i.e.*, red, green, etc.—and it goes without saying that the colour and the flavour should correspond : red for strawberry, purple for grape, etc. In case colour is used in vanilla ice cream it should impart a cream shade to the ice cream. There is one flavour, however, for which two colours are appropriate. Mint ice cream may be coloured either pink or green, depending upon which you associate with a mint-flavoured product.

Intensity of the colour added may have just as important a bearing on the appeal of ice cream as the shade which is used. In this connexion it has been interesting to note the decrease in the amount of colour used in recent years particularly in vanilla ice cream. A factor which undoubtedly tends to reduce the amount of added colour is the general principle that as we increase our appreciation of foods we tend to demand finer flavours and more delicate colours.

Technique of Preparation

Although colours are originally sold in the dry form as primary or secondary colours, they are frequently made up for distribution and use in the paste and liquid forms. Whether the manufacturer of ice cream purchases colours in the primary and secondary dry forms, in paste or in liquid, will depend upon several factors, among which the most important are the amount used and the time which the colour is to be held before using. The costs will be lowest in the dry form. The keeping quality will usually be best in the paste form. The liquid colour, purchased as such, should not be kept over a long period.

Perhaps the most satisfactory answer to the problem for most plants will be the purchase of the colours used in largest amounts, such as strawberry, for instance, in the dry form and the colours used in very small amounts in the paste form. It should not be implied from this that dry colours will not keep. They will do so indefinitely if kept dry. Under plant conditions, however, if they are left unsealed and in contact with air of high humidity, moisture will be absorbed, resulting in caking and deterioration.

If liquid colours are purchased and more especially if liquid colours are made up in the ice cream factory, the perishability of such colour solutions should be recognised. A number of investigators have called attention to the growth of micro-organisms in such colour solutions. Hammer of Iowa, Fabian of Michigan, Smallfield of Ontario, and Tracy of Illinois all report high bacterial counts in such material. Smallfield reports contaminations as high as 100,000 per c.c. in the finished mix as the result of using fermented colour solutions. Not only may the contamination be appreciable, but the types of organisms may be quite particularly undesirable.

In order to avoid bacterial contamination from colour solutions, several methods have been suggested. Some of these are feasible, but others, such as using dry mixtures of colour and powdered sugar, are not adaptable to many of our plants.

The use of 45 per cent. sugar solutions as a vehicle for liquid colours has been suggested. In this case the solution is either boiled two minutes or heated to 180° and bottled while hot. A 10 per cent. solution of alcohol has been found to be satisfactory, but higher concentrations of alcohol interfere with dissolving the colour.

Dry, Paste and Liquid Forms

The following procedure has been found fairly satisfactory :

Weigh out the dry colour. The amount will vary with the dye strength. Add the colour to a clean bottle which can be tightly stoppered. Add boiling water to dissolve the colour, filling the bottle. Keep in as cool a place as possible. Keep bottle stoppered. Make up fresh colour frequently—every two weeks, or less if possible. If the colour is not used within a month, discard it. Contact with metals should be avoided. For colours which are used infrequently, jars or preferably tubes of paste colours are very satisfactory. A small amount of liquid colour can be made up by mixing a minute quantity of the paste with water. Special colours may be made by blending two or more colours. A variety of shades are possible and the appropriate colour may be secured. These paste colours may be kept for a year or longer without any apparent deterioration and they do offer the ice cream manufacturer the opportunity of carrying a large variety of colours.

In conclusion, the selection of colours, so far as form is concerned, depends upon the volume used. For large amounts the dry primary, certified colours are the lowest in cost, but the secondary shades may not cost enough more to justify doing your own blending. In buying secondary shades, look for the percentage of dye content and buy colours on the basis of the amount of actual colour you get for your money. Liquid colours are usually rather perishable, and may be a source of considerable bacterial contamination in ice cream. Prepare them fresh, under conditions which will largely eliminate spoilage so far as possible. Use colour skilfully, keeping in mind that too much colour in ice cream, like too much rouge on a woman's cheek, to some people at least, is an indication of cheapness. —*Milk Messenger.*

Diet and Tuberculosis

A SCIENTIFIC meeting of the Scottish Group of the Nutrition Society, held at Dundee on October 7, dealt with the subject of Diet and Tuberculosis. Discussion ranged round three questions—the influence of a poor diet on the incidence of tuberculosis, the effect of diet on the incidence of tuberculosis, the effect of diet in treatment and the provision of tubercle-free milk.

Semi-Starvation and Tuberculosis

Dr. I. Leitch of the Rowett Institute brought evidence from numerous papers published since the last war to show that semi-starvation and an increase in tuberculosis were definitely related. The clinicians, though recognising the validity of this testimony, were unable to confirm it from their experience. Dr. R. Y. Keers said that, while we know that malnutrition is a factor in lowering resistance, we cannot produce evidence pointing unequivocally to malnutrition as being the sole or even the most important precipitating cause of the rise in the incidence of tuberculosis which has occurred during the present war. He pointed out that the patients of a private sanatorium come from a section of the community in which malnutrition is not encountered, yet this section has not been spared in the rising incidence of tuberculosis. It would appear that long hours, strain and ill-spent leisure were the prime etiological factors and that deficient diet played an insignificant part. Dr. Stuart Laidlaw (Glasgow) emphasised the importance of bad housing, but pointed out that even when patients were rehoused, they were often placed at such distances from town, and the rents were so much higher, that the additional expenses had to be met by spending less on food.

Types of Diet

Diet has always been regarded as an important factor in the treatment of tuberculosis. Walther, wishing to counteract the loss of weight which so many patients show, introduced the method of superalimentation, in which his patients were literally crammed with food without regard to their ability to digest it. This system has now given place to more rational methods. There is now general agreement that the patient does best on three well-balanced meals a day, given at regular mealtimes. Interval snacks may interfere with the appetite at the next meal. The food should be pleasant, varied and satisfying; it should be what the patient likes, or to what he is accustomed, and should be a little more in quantity than that required by the average healthy person of similar physique. Most authorities agree that there should be a liberal supply of protein in the diet owing to the tissue wasting which occurs in this disease and the important part which protein plays in repair and renewal of exhausted tissues.

Whether carbohydrates have any specific part to play in the treatment of tuberculosis is still undecided, but they are easily assimilated and digested, and, properly selected, make a valuable contribution to the diet. Extra fat has long been considered an essential in the treatment of tuberculosis, and has often been pushed with unnecessary rigour. Many patients cannot deal with large quantities, and excess merely leads to nausea and gastro-intestinal upset. Dr. Keers recently investigated the effect of increasing the fat intake in certain of his patients. During the first four months these cases showed a more rapid gain in weight than the controls, but this was not maintained, and at the end of nine months there was little difference between the two groups. It was concluded that there was nothing to be gained by any attempt to force the fat intake beyond that which the patient can ingest and assimilate completely. As the result of his experience Dr. Keers considered that the war-time diet of the tuberculous patient is not deficient in nutritive properties and that it contains everything which is necessary for treatment.

Tubercle-Free Milk

The provision of tubercle-free milk is a problem of first importance in public health. Until 1935 there was no official scheme in Britain for the eradication of tuberculosis from cattle. The scheme made good progress up to the outbreak of war, particularly in certain areas. There are now 4,088 attested herds in England, 8,588 in Wales and 3,569 in Scotland, but this represents less than a tenth of the total cattle population. In three areas—Cardigan, Pembroke and Carmarthen; Ayrshire; and the county of Bute—the proportion of attested to non-attested herds is in the neighbourhood of 60 per cent., while in certain other areas the numbers are negligible.

Future Plans

In discussing the future Mr. J. N. Ritchie, M.R.C.V.S., of the Ministry of Agriculture, compared the position with that in the United States. In America there has usually been a surplus of cattle, and no serious interference with meat or milk supply was to be feared when wide areas were dealt with simultaneously, and eradication was completed between 1917 and 1941. Conditions in Britain are different, and it would be foolhardy to attempt to test cattle in numerous large areas at the same time. Small areas must first be cleared to provide adequate replacement cattle, and it would be not unreasonable to suggest that area eradication should be begun in those districts where most progress has already been made.

Pasteurisation

Another plan to provide clean milk is to destroy any organisms it may contain. Where milk has to be sent a considerable distance to a city it has become the practice to submit it to the action of heat before dispatch. This certainly improves its keeping qualities, but it does not guarantee freedom from tubercle bacilli unless specific conditions have been observed. Inadequate heating fails to kill the bacilli, while overheating produces physical changes in the milk. It has been fairly established that a temperature of 68° C. (140° F.) for a period of 15 to 20 minutes is lethal to the organ-

ism. It has also been suggested that exposure to 71·1° C. (160° F.) for 12 to 15 seconds is equally effective. In practice a wide margin of safety is desirable, as during the process of pasteurisation there is much opportunity for conditions to arise which give protection to the organism. Properly carried out pasteurisation effectively destroys the tubercle bacillus.

The Phosphatase Test

The introduction of the phosphatase test has been of the greatest value in determining the efficiency of heat treatment of milk. Phosphatase, an enzyme naturally occurring in milk, is destroyed at all combinations of temperature and time normally used for the heat treatment of milk. Thus if the milk has been treated sufficiently to destroy 98 per cent. of the activity of the enzyme it may safely be concluded that the tubercle bacilli have been destroyed. The test has proved invaluable in demonstrating minor faults in pasteurising plants which, according to the recording apparatus, were working efficiently.

Food Production in the Antipodes

WITH the issue of new food rationing books a cut of 2 oz. in the civilian butter ration reduces it to 6 oz. weekly. Each butter coupon has a value of ¼ lb., as formerly, but three coupons cover a four-week period instead of two coupons good for a fortnight, expectant mothers receiving 8 oz. a week. The reason for the cut has been the steady decline in production. Contributing factors are an unusually dry season; lack of manpower on farms, resulting in the sale of some of the dairy herds; high beef prices, causing a swing to meat production from that of milk in many cases; and increased demands for milk in bulk.

Butter consumption so far in 1944, including supplies for the armed services and for exports, averaged 9,000 tons monthly, and reserves would have to be increased to 5,000 tons before the weekly civilian ration of 8 ozs. could be restored. It is hoped that this may be possible when better supplies are obtainable.

There is no vegetable margarine for civilian use in Australia to supplement the butter ration. However, the quota of animal margarine for civilian use (95 per cent. of which is distributed in bulk to bakers and pastrycooks) is 500,000 lb. a month, representing one-tenth of total production.

Reduction in Sugar

The net profit of £873,969 realised by the Colonial Sugar Refining Co. for the year ended March 31, 1944, is a decrease of £167,632 from the figure for the previous year and the lowest since 1932-33.

Australian sugar production in the past season has been reduced to 505,000 tons, the smallest output since 1927. Shortages of manpower, fertilisers and farm implements have contributed to the decrease in Australia, while Fijian production was affected by strikes and other industrial troubles.

Sales of refined sugar products in Australia and New Zealand totalled more than 500,000 tons, and those of "Cane-ite" board further increased. Distillery production, however, was affected by the shortage of raw materials. It is estimated that the yield for the coming season will be about 570,000 tons, which, however, is still below normal. The Fijian crop is expected to yield 85,000 tons.

Australia's "War Foods"

To the end of December, 1943, the value of Australian food shipments to Britain, other parts of the Empire and to the Allied countries had reached the grand total of £242,461,000. The value of exports of food and beverages to overseas destinations, and the percentages which these exports make up of total shipments were as follows: To Britain, £129,527,000 (53·42 per cent.); Eypt, Syria, Palestine, and other destinations undisclosed, £32,572,000 (13·43 per cent.); India, Ceylon, Burma, £16,865,000 (6·96 per cent.); Pacific Islands, £9,216,000 (3·8 per cent.); British Malaya, £7,705,000 (3·8 per cent.); Netherlands East Indies, £5,346,000 (2·21 per cent.); South Africa, Rhodesia, British West Africa and British East Africa, £3,455,000 (1·42 per cent.); all other countries, £37,775,000 (15·58 per cent.).

The principal foodstuffs shipped were: Butter, 757,224,000 lb.; cheese, 151,497,000 lb.; fruit, dried or in liquid, 856,593,000 lb.; meat of all kinds, 2,167,109,000 lb.; jams and jellies, 136,601,000 lb.; sugar, 23,588,000 lb.; eggs, in shell or as powder, 6,573,000 lb.; dried butter-fat, 6,166,000 lb.

Dairy Output

New Zealand concluded this year the third successive unfavourable season, the last being more noted for unfavourable climatic conditions than the previous two. The feed shortage in the winter of 1943, combined with bad weather, led to an appreciable mortality among dairy cows and the poor wintering of stock generally.

In many districts the herds commenced last season (October, 1943) in poorer condition than usual, the result being a decrease in production. Improvement in weather conditions later on helped to save the situation somewhat. Contributing causes to decreased production were the use of less fertiliser, shortage of farm labour, and the milking of considerably fewer cows.

The total gradings for export to the end of last April, nine months of the production year, showed a decrease in both butter and cheese. The butter-fat production fell 9·74 per cent. as compared with the similar period of the previous year. Before the war the statistics of butter-fat for export gave a fair indication of total output, but at this writing the figures are not very reliable because of large quantities of dairy produce, including dried milk and condensed milk and cream, required for the armed forces in this theatre of war.

The value of dairy products exported for the year ended March 31, 1944, was £24,013,294, a decrease of over £5,000,000 from the year before. Of the total exported, butter was valued at £15,487,668 and cheese at £7,974,547. The percentage of ships sailing out of the port of Auckland *with food supplies* has been considerable during the war years. The figures for 1944 may be nearly as large as those of 1943 with regard to the gross tonnage of ships entering the port, which amounted to 4,756,066, more than 500,000 tons over the previous year.

Plum Butter

GEORGE H. RAUCH

PLUM butter is a product known under different names and descriptions on the Continent of Europe and in the U.S.A. In South-Eastern and Central Europe it is an important staple food. It is used as an all-round preserve, ranging from a bread-spread to baby food. For Britain it presents an interesting peace-time line.

It must be emphasised that plum butter is not a substitute for plum jam; it is a product with a marked individual character. In taste it is rather more acid than jam, and has a strong and peculiar flavour. In some special products the flavour is underlined by the use of different spices.

Plum butter is preferred to jam by people who find jam too sweet, or those who prefer strong fruit flavour to sweetness. Its low content of sugar and its firm consistency make it a suitable material for cooking and baking purposes. The troublesome sweating experienced with jam, which results in the softening of the pastry, does not occur with plum butter, and this makes it an ideal material for confectionery purposes.

Raw Material

The main ingredients of plum butter are plum pulp or prunes, or a combination of the two, white or brown sugar, glucose, colour, and, if desired, spices. Whether plum pulp and prunes are used separately or in combination is a matter of taste and experience. Each of these alternatives will result in products of different taste, character and texture; the methods of production are, of course, in each case different.

Production of Plum Butter from Prunes

In order to produce a product of good keeping properties, it is necessary to base the recipe on a minimum content of 58 to 60 per cent. of soluble solids in the finished product.

Table 1 shows a combination of ingredients which guarantees a content of at least 58 per cent. of soluble solids.

TABLE 1

Ingredients.	*Weight.* (*lb.*)	*Soluble Solids.* (*Per Cent.*)	*Soluble Solids.* (*lb.*)
Prunes	90	45	40·5
Sugar	15	100	15
Glucose ...	5	80	4
	110		59·5

Theoretical output: 100 *lb.*

The choice of the right variety of prunes is very important. The peculiar flavour of Bosnian prunes makes this variety the most suitable one for plum butter production; the next best is the Californian prune. The more acid medium-sized varieties are preferable to the larger-sized sweet ones.

The figures in the recipe are only approximate. The size of prunes has to be taken into account as larger-sized prunes yield fewer stones per lb. than smaller ones. The recipe is based on prunes of size 80/100 Californian grading. Then again the content of moisture in prunes is very different. Generally 100 lb. of Californian prunes of size 80/100 should yield after soaking and sieving 300 pounds of pulp of suitable consistency, and of approximately 15 per cent. of soluble solids. Very dry prunes or prunes of better grading will stand more water. The procedure of production is as follows:

The prunes are first soaked and subsequently cooked. For the soaking process specially adapted casks or tanks are used. The heads of the casks are removed and steam coils are inserted. It is necessary to soak the prunes for at least 24 hours. After soaking, the steam is turned on and the prunes are cooked until they are soft and suitable for sieving. A medium sieve should be used as the pulp must be of fine texture without coarse fibres.

It is obvious that a large amount of water has to be boiled out in order to produce plum butter of the required content of soluble solids. It is therefore advisable to use a vacuum boiler, but where vacuum boilers are not available, ordinary boiling pans may be used. Pulp and sugar are mixed and brought to boil. Vacuum boilers, as a rule, have mixing arrangements, while boiling pans make continuous stirring necessary.

The mixture should be boiled until it reaches a firm consistency. Occasional refractometer tests are advisable. At the final stage of the boiling, glucose and colour are added. The colour of the product varies in the different countries from chocolate brown to bright black. Where chocolate colour is wanted, caramel colour is used.

Plum butter should be filled as hot as possible into previously heated containers.

Plum Butter from Plum Pulp

Either fresh plums or preserved plum pulp may be used. The high acidity of English plums makes a change of the basic recipe necessary, as in Table 2.

TABLE 2

Ingredients.	*Weight.* (*lb.*)	*Soluble Solids.* (*Per Cent.*)	*Soluble Solids.* (*lb.*)
Plum pulp (sieved)	200	16	32
Sugar	22	100	22
Glucose	5	80	4
	227		58

Theoretical output: 100 *lb.*

Plum butter produced from fresh plums makes colouring unnecessary. If preserved plum pulp is used caramel colour is added.

Plum Butter from Plum Pulp and Prunes

The aforementioned varieties of plum butter represent products of quite different character. The first is rather sweeter and has a typical prune flavour; the second is more acid and tastes predominantly of plum. It is, of course, possible to blend both varieties. The process of production in that case is a combination of both methods. Prune pulp, after soaking and sieving, is mixed with plum pulp in a proportion according to individual taste. The basic recipe is given in Table 3.

TABLE 3

Ingredients.	*Weight.* (*lb.*)	*Soluble Solids.* (*Per Cent.*)	*Soluble Solids.* (*lb.*)
Prunes	45	45	20
Plum pulp (sieved)	100	16	16
Sugar	18	100	18
Glucose	5	80	4
	168		58

Theoretical output: 100 *lb.*

Spiced Plum Butter

Spiced plum butter is a special product of quite a peculiar character. It is frequently used to accentuate the flavour of prunes. The combination of spices is a matter of taste, and the following assortments are used:

For 100 lb. of plum butter:

(*a*) 100 g. Cinnamon.
25 g. Cloves.
25 g. Ginger.
150 g. Dried lemon peel.

(*b*) 50 g. Ginger.
50 g. Cloves.
150 g. Cinnamon.
500 g. Dried lemon peel.

All spices must be finely ground and mixed. They should be added at the final stage of the boiling.

Storage of Plum Butter

Plum butter should be stored in well-aired and cool places. Stone jars of all sizes are preferable to any other packing. For confectionery purposes, casks or other wooden containers may be used. In any case it is essential to fill plum butter as hot as possible. Its keeping qualities are excellent—properly stored plum butter will retain its full flavour for many years.

British Standards Institution

THE annual general meeting of the British Standards Institution was held on October 17.

The Right Hon. Lord Woolton, C.H., P.C., was elected president of the Institution, and Sir Percy Ashley, K.B.E., C.B., was elected vice-president; Sir William Larke, K.B.E., succeeded Sir Percy Ashley as chairman of the general council.

Sir Percy Ashley concluded his term of office as chairman of the general council with a brief review of the work done as a direct aid to the war effort by the British Standards Institution and the progress made during the same period in the preparation of British standards for industrial and commercial materials and appliances.

He pointed out that the post-war reconstruction work was now beginning and would increase.

Sir Percy concluded by saying: "Industrial standards—providing for accurate and precise trade descriptions, methods of sampling and testing, and standards of performance—are likely to be increasingly desirable. If they are to meet the general acceptance they must be prepared and promulgated by either a Government Department or an independent body—independent, that is, in the sense I have indicated, set up and maintained by the national industry as a whole, with Government support, but not under Government control. Such an organisation has been built up during forty years in the British Standards Institution. That British industry would prefer it to any form of Government Standards bureau I have no doubt, just as I have no doubt that, though it may be necessary in some cases for Government to enforce the observance of standards, yet broadly progress will be most widespread and continuous if the policy of 'standardisation by consent' is consistently pursued and if whatever changes in organisation and methods may be made from time to time the principles on which this Institution has been so successfully built up and developed are steadily maintained."

The meeting terminated with a high tribute to the exceptional services rendered by Sir Percy Ashley to the Institution and through the Institution to industry as a whole, not only during the five years of his chairmanship of the General Council, but during the very many years of his association with the work of the Institution.

Plans, Proposals and Promises

RARELY in the history of this country have so many social reforms been contemplated in so short a time. Education, full employment and social security plans have been announced by the Government in their logical order, and gradually the framework within which the economic life of the nation is to be built takes shape.

The effectiveness of all these plans, however, will depend to a large degree upon the success with which the full employment policy is executed. The Government has declared that it accepts as one of its primary aims and responsibilities the maintenance of a high and stable level of employment after the war, but before any such long-term policy can be achieved there will be many obstacles to be overcome.

The Transition Period

First will come the awkward transition period when industrial activity will be diverted from war to peace production. This change-over will begin with the defeat of Germany, and fortunately—if the term may be used—will be less drastic than in 1918 because of the need for arms in the war against Japan, but, nevertheless, it will be essential to find jobs for those workers who will be displaced by the diminution in war production.

Basic industries such as steel and textiles will not be affected, but it is inevitable that in some particular industries and in some communities there will be a temporary reduction in employment.

After the last war there was a short period—not more than a few months—of dislocation and unemployment while industries were switching over from war to peace production. There then followed a brief but violent boom, which reached its peak in the summer of 1920, while stocks were being replenished, arrears of maintenance being made good and the accumulated demands of foreign countries satisfied. Unemployment was very low and prices soared, but as soon as demand at home and abroad slackened towards the end of 1920 prices began to slump, and unemployment set in.

There should, however, be no problem of general unemployment this time, although there will be the risk of unemployment due to dislocation in the "change-over."

Absorption of Manpower

The present war has seen the absorption of practically all employable manpower. This is not remarkable, of course—it happened in the last war, too—but it has shown that, at the most, only 75,000 persons are unemployable. The importance of this figure is considerable, for it is quite certain that the demand for manpower will be greater than the supply available in the reconstruction period, and the lower the "unemployable" figure is the more likely is it that our national prosperity will be restored, for it will mean that the potential productive capacity of the nation will be almost 100 per cent.

It is estimated that 23 million men and women are at present gainfully employed, and that 80 per cent. of them are working directly or indirectly for the Government. When the time comes for the "change-over" to peace production approximately 7,000,000 will be involved, although this will by no means entail their finding new jobs. Many will remain in the same firms; the only change being that they will be occupied in producing goods for civilian instead of military purposes.

Need for Civilian Goods

As men return from military service so will the need for civilian goods increase. These civilian needs will inevitably create employment for the men returning to civil life and, providing the raw materials are available, a considerable proportion of the labour released will automatically be absorbed.

At the same time, the Government's plan for rebuilding provides for a post-war construction programme which will require a labour force of at least 1,250,000. One of the main principles of this plan is the maintenance of stability in the industry throughout the duration of the programme—a period estimated at between 10 and 12 years. Thus one of the most unsatisfactory characteristics of the building industry—casual labour—is to be countered by adequate guarantees of conditions to eliminate it.

The provision of an immense building project is bound to stimulate many other forms of industry, and consequently lead to the maintenance of large-scale employment on a long-term basis in post-war years.

A Job for Everyone

There is no doubt that under wise direction a job could be found for everyone for many years to come, but as it is, in the initial stages, impossible to discount entirely the likelihood of temporary unemployment it is necessary that plans be made now for the equitable allocation of the jobs available.

Of paramount importance is the need to establish in the minds of the demobilised men the fact that they are being dealt with fairly. This can be best ensured by giving, as the British Legion has suggested, preference in employment to all those who have served in the armed forces. The British Legion, which may justifiably be accepted as an authority on matters relating to ex-Servicemen's requirements, claims that priority in re-employment should be given to fit ex-Service personnel as well as to those who are disabled. These men must be made to realise that every effort is being made to provide them with a job on their return to civilian life. Unless, and until, they do, all the social security proposals will be valueless; for there is nothing more a man wants now than the assurance that there will be work for him when he is demobilised.

Dried Potatoes for Caterers

A LIMITED quantity of dehydrated potatoes, the supply of which has hitherto been reserved for the use of the Services, is now available for purchase from the Ministry of Food by catering establishments and institutions in order to enable them to test the value of this new type of food.

These dehydrated potatoes have been produced in factories in the United Kingdom. They are in strip form, and only require to be reconstituted before being cooked like ordinary potatoes. The dehydrated potatoes should be soaked in boiling water, kept hot for about an hour, and then given a short cooking. One pound of dehydrated potatoes will produce about five pounds of cooked.

Dehydrated potatoes are particularly valuable for catering during a time of labour shortage. They come out of the tin ready for reconstitution and cooking. There is no washing, peeling, eyeing or trimming; there is no waste, and no dirt is brought into the kitchen. They can be served boiled, mashed, fried, baked in sauces with herbs, onions, bacon, etc., or served *au* gratin. They are useful in soups, stews, and braises or in shepherd's pie, rissoles, croquettes and other made-up dishes.

The appearance and flavour of cooked dehydrated potatoes are very good and they contain the bulk of the carbohydrates and protein to be found in the fresh product. Only the best potatoes can be dehydrated, and dehydrated potatoes are therefore a first-class food. They save work and waste in preparation, and when cooked have a natural appearance and texture.

The following are the arrangements for purchase:

The product is packed in tins containing 12 lb. of dehydrated potatoes, which is roughly equivalent to 84 lb. of raw potatoes (field weight). Two tins are packed in a fibre-board case. Directions for reconstitution will accompany each consignment.

The minimum delivery to each buyer will be one case. The maximum first delivery to each buyer will be ten tons.

U.S. Dehydration Research

In order to provide expanded industrial markets for the products of U.S. farms, the U.S. Government is financing experimental work which is performed at the Philadelphia new two-million-dollar Eastern Regional Laboratory of the Department of Agriculture and in three companion research centres located at New Orleans, Albany, California and Peoria, Ill.

These laboratories comprise together one of the nation's largest chemical and chemical-engineering set-ups. Authorised by Congress in 1938, they began full operation in 1941, and each of the four spends about one million dollars a year on research and development work.

Each regional research centre specialises in finding new markets for the prime agricultural products of its area. The Philadelphia Government Laboratory, for instance, in the course of its search for new uses of the East's apples, developed the so-called " apple honey " used in some cigarettes as a moisture-retaining stand-in for glycerine.

The U.S. Western Laboratory has done a lot of pioneering work on dehydration. New Orleans research men have specialised on cotton, sweet potatoes and peanuts, and Peoria has centred its attention on the Mid-west corn, wheat, soya beans and agricultural residue products.

The regional laboratories work closely together with potential industrial users, and ideas and information are exchanged before the product is ready for production. In the case of " apple honey," actually an apple syrup with the taste removed, some 10 or 15 companies are in production. In 1942, 3 million lb. of the syrup was produced, and last year, despite crop shortages, output rose to between 4 or 5 million lb.

The laboratory is hopeful that the new fruit concentrate process will prove to be a great triumph. It forecasts possible large markets in the bakery, candy, ice-cream, jelly making and soft drink industries. The laboratory reports that processors are showing marked interest, and it expects commercial production to be in full swing next autumn.

Using the process, the actual flavour of the fruit can be extracted from apple juice and concentrated to 150 times its natural strength, and it is believed that the same technique can be extended to other fruits and vegetable. Exploration of the full potentialities of the process are under way.—*Reuter's Trade Service.*

Milk and the Consumer—Part III

(*Continued from page* 430)

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Roaches in Food Factories

(*Continued from page* 434)

Cleanliness is the first requisite of any insect control method, and therefore all refuse should be removed from the factory at the earliest possible opportunity.

Traps of various kinds offer a simple and sometimes a very effective method of reducing the roach population of a factory where the infestation is only small.

The Americans, ever to the fore in these matters, appear to have developed a novel device for destroying cockroaches by infra-red irradiation. The practical value of such a method of control still remains to be demonstrated.

Food manufacturers have not yet had the opportunity of testing out the new insecticidal material D.D.T. (Dichlorodiphenyl-trichloroethane) in their premises. Perhaps in this new product, when it is released for general use, may lie the answer to the roach problem as far as food manufacturers are concerned.

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Trade News

£70,000 Gift to University

Sir Robert M'Vitie Grant, Bt., chairman and managing director of M'Vitie and Price, biscuit manufacturers, Edinburgh, London and Manchester, has made a gift of £70,000 to Edinburgh University Court for the purpose of establishing a Chair of Dermatology. This chair will be the first of its kind in Britain. The founding of this chair marks a significant development in view of the increasing attention that is being given to the study of skin diseases. The frequency and common incidence of these conditions, their peculiar resistance to treatment, and their association with many types of industrial activity offer fruitful fields for clinical observation and research; and it may be anticipated that the facilities now to be afforded will provide the means by which substantial progress will be made in our knowledge of this field of medical science.

Sir Robert's father, Sir Alexander Grant, Bt., began his career as a baker's boy at Forres and became a millionaire who made many notable grants and benefactions to Edinburgh. His death occurred in 1937.

* * *

British Filters Ltd.

At their new showroom at 32, Berkeley Street, W. 1, British Filters, Ltd., will receive technical enquiries and arrange appointments between out-of-town engineers and designers and the firm's consultant staff. Filtering equipment of different kinds is displayed.

The firm's objective is to design equipment of the highest possible degree of efficiency for all purposes. They are prepared to design a filter for any requirement provided that the conditions under which the equipment must work are disclosed. Armed with this knowledge, the filter will be made and tested on the road or in laboratories similar to those in which it will eventually operate. Each filter is supplied with a test report and guarantee.

"TROPIC-PROOFING" OF WAR STORES IS DEMONSTRATED AT ANGLO-AMERICAN EXHIBITION

Forces ask Industry to Guard Lines of Communications

GENERAL MacArthur, Lord Mountbatten, and the men of the South-West Pacific and South-East Asia Commands are quite capable of whipping the Jap. So that they can make a good, quick job of it, however, they want British and American manufacturers to take over from the Forces the task of dealing with Japan's five allies. Those allies are Distance, Climate, Terrain, Jungle Pests, and Environment.

The Tropic-Proofing Exhibition opened by the Anglo-American Packaging Exhibition Committee at the Central Ordnance Depot, Feltham, Middlesex, is an armoury from which the contractor can choose his weapons.

When Germany is on the floor and the weight of the United Nations is switched against Japan the character of the war will change. We shall be fighting in conditions which only a portion of America's forces and a still smaller portion of Britain's have experienced. The reckless waste of material which in previous wars has been accepted as inevitable cannot be tolerated, because, fighting five and six thousand miles from the centres of production, our armies' efficiency is limited not only by the war potential behind them, but by the proportion of that equipment which reaches them in usable condition. Both distance and natural handicaps multiply in far more than geometrical progression the serious consequences of wastage in the Far East, compared with the Western European theatre of war.

The problem is the threefold one of *preservation* against corrosion, insect pests, and fungi; *packing* against rough handling, immersion, and transhipment hazards; and *identification* against loss and mislaying, and storekeeping difficulties of active service.

This Exhibition teaches the contractor and his packing staff how to deliver his goods, whether it be a machine-gun or an X-ray apparatus, dehydrated potatoes, or refrigerated serum, in such a condition that they can immediately be used. Until now ordnance personnel has carried out this "tropic-proofing"; in future the obligation will be on the contractor. The ordnance authorities put their information and experience wholly at the contractor's service; the contractor has only to ask for them.

The Exhibition is merely the shop window. Behind it are facilities for inspecting Army depots where preservative treatments and packing are carried out, demonstration vehicles for bringing instruction to the contractor's packing staffs, specifications laying down approved methods for each item of war stores, names of suppliers of packing material, and facilities, through the Ministries of Production and Supply, for getting the necessary material and machinery.

Lessons learned from the study of tropical packing have led to the adoption of three main types of package insisted upon by the Services:

> METHOD 1.—Intended for all equipment which can be given heavy, durable coatings of corrosion preventives. The package itself is not sealed, but allows water and water vapour and corrosive atmospheres to have comparatively free contact with the contents.
>
> METHOD 1A.—A waterproof, sealed package which never allows more than moisture-vapour penetration to the contents. Light, easily removable corrosion preventives are applied to the contents, and the wrapping or container (termed "barrier") is

sealed in such a way that it resists penetration by water, though not water vapour.

METHOD 2.—Intended for stores which cannot themselves be coated with preservatives. The equipment must be entirely surrounded by a sealed barrier, proof against water and water vapour, generally with a dehydrating agent such as silica gel enclosed within the barrier to absorb any moisture which may be inside the package. Even in this pack critical surfaces subject to corrosion should be given a light oil type of preservative coating if this can be done.

There are four main groups of approved preservative, each designed for a particular need, details of which are given in the official specifications.

How these principles of minimum protection are worked out and applied is demonstrated by the exhibits, and the following are a few examples likely to be of special interest to manufacturers of food stores.

Sugar.—Packed 10 lb. per cotton bag, 6 bags in a 5-ply multi-wall paper bag.

"C" Ration.—Contains rations for 8 men for one day, 24 tins in all. Eight breakfast biscuit tins, 8 dinner biscuit tins, and 8 supper biscuit tins. These tins contain breakfast cereal, soluble coffee, lemon crystals, sugar, 4 tins of each of 6 types of meat products. In addition there are 8 metal foil laminated envelopes containing sweets, cigarettes, matches, water-purifying pills, and toilet tissue. The tins are all sufficiently coated for protection and camouflage and are a key-opening type.

Condiment Kit.—This kit contains a supply of standard condiments, flavour, spices, and other kitchen supplies sufficient for 1,000 men for one day. These are standard tins sealed inside a moisture-vapour-proof bag liner inside a wooden box.

10-in-1 Rations.—Contains rations sufficient for 10 men for one day. Those items which are liable to be affected by exposure are packed in a waxed dipped carton. Remainder of the items are packed in undipped cartons. Two of each of these cartons are packed in a "V" board box with sleeve.

"K" Ration.—Breakfast, dinner, and supper rations are separately cartoned in wax-dipped packages. Biscuits, sugar, beverage, and gum are sealed in a regenerated cellulose, laminated bag. Sufficient rations for 12 men for one day are packed in a corrugated box inside a nailed wooden box.

Dehydrated Shredded Potatoes.—Potatoes are packed in a corrugated carton and sealed inside a metal foil laminated bag, which is then placed inside another carton sealed with bitumen and shipped inside a nailed wooden box.

Battle Rations.—This contains sufficient tins of tomato juice, meat and beans, biscuits, candy, gum, wooden spoons, and folding tin-opener to supply 12 meals. This material is packed inside a large square metal tin whose friction top is spot-soldered. Two of these tins are packed inside a nailed wooden shipping box.

Lifeboat Rations.—Each tiny key-opened tin contains sufficient sweets, vitamin tablets, and chewing-gum to maintain one man for 5 or 6 days.

Preservation of Metal Parts

Apart from the immediate and practical interest of the Exhibition to the packer of pharmaceutical and other chemical supplies, it holds a great deal of technical interest for the chemist in the progress it shows in the development of preservative coatings for engineering products, and in paper and fibrous packing materials impregnated with substances intended to resist penetration by moisture, fungi, moulds, and insects. Cinema films have been prepared to demonstrate the nature and use of these compounds and wrappings.

Elaboration of transparent cellulose films and rubber hydrochloride films into forms which give protection against a wide range of destructive agencies is a striking example of the value of intensive research, while the multi-layer wrapping materials available represent an astonishing advance in packaging technique. These exhibits alone are sufficient reason for paying the Exhibition a visit for production executives who want to know how packaging technology has developed behind the veil of official secrecy. It is only to be regretted that the examples shown are so largely the product of the American packaging industry's ingenuity. Have British paper and packing firms been deprived of *any* opportunity for research?

Immersion of small metal parts in ethyl cellulose, drying to form a tough skin which can easily be peeled off is a practice, demonstrated by at least one exhibit, which shows that science has learned to copy nature's most perfect form of packing, the form which gives us the orange and banana. (Did the inventor of the ampoule consciously model his container on the egg?)

Another lesson of the Exhibition is the discovery of the efficiency and versatility of lanolin for the temporary preservation of machine parts, while a rediscovery of an old truth is that for a high proportion of stores a coat of paint is still the ideal and unimprovable preservative.

The All-Important Label

Finally, the organisers of the Exhibition ram home the fact that, however perfect the packing and the preservative, the contents may easily become useless for the lack of a label—the means of identifying the contents *without* stripping it of its wrappings. Once the ordnance stores clerk has opened a package in the search for the item he wants, the contents is exposed for water-laden air, mould, and pests to start the process of deterioration. Accurate labelling, and methods of affixing labels which keeps them fixed, are of fundamental importance.

Readers who wish to learn the lessons this Exhibition is capable of teaching are assured by the authorities of every aid, without formality. In refreshing contrast to the methods employed by other Government departments, there are no "usual channels" through which applications must pass. Letters should be written to the Commandant (Anglo-American Services Exhibition), Central Ordnance Depot, Feltham, Middlesex, or phone Feltham 2821 (extension 13 or 200).

Mr. J. Valentine Backes

Mr. J. Valentine Backes, A.R.C.Sc., A.R.I.C., D.I.C., director and general manager of Messrs. Ch. Goldrei, Foucard and Son, Ltd., was on October 2 elected to the Livery of the Bakers' Company at their Quarterly Court.

Mr. Backes is also a Liveryman of the Worshipful Company of Basketmakers and the Worshipful Company of Carmen. In February, 1938, he was admitted Freeman of the City of London.

His war-time activities have brought him a number of chairmanships, and in appreciation of his work of inaugurating and acting as chairman of these Trade Committees a presentation with an illuminated address was made to him in 1943.

* * *

Industrial Law for Executives

A correspondence course in industrial law has proved of great benefit to a large number of persons who have been drafted into executive positions in industry and who required a working knowledge of industrial law but who could not afford to give prolonged study to the subject. The course consists of six lectures, each of which can be read in one to one and a half hours, and students are invited to submit any questions they wish on the lectures. Particulars can be obtained on application to the Secretary, Industrial Welfare Society, 14, Hobart Place, London, S.W.1.

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Economy in Bottle Washing

In industrial establishments where regular cleansing of such items as bottles is part of the normal operations the quantities of water used are often very large. In war-time, and also when there is a shortage of water, it is important to recover the water for re-use. It is equally important at all times to recover the heat contained in the water. If, for example, 10,000 gallons of water is brought to the factory at a temperature of 50° F. and is heated for the purpose of washing to 140° F., the heat given to the water is 9,000,000 B.Th.U. The boiler in which the water is heated may have an efficiency of 70 per cent., so that the heat required in the form of fuel is roughly 12,800,000 B.Th.U. If the water is heated by coal costing 40s. a ton, the cost of fuel for heating the 10,000 gallons would be nearly 20s. plus the wages cost for the boiler fireman. If the water were heated by gas at, say, 6d. a therm, the cost of the fireman would be cut out and the fuel cost would be 64s. To these costs must be added the cost of the water.

A plant recently installed was required to supply 120 gallons an hour of clean water at 140° F. for the purpose of washing bottles which were to contain a well-known household cleanser. The dirty water was to be recovered and re-used after being brought back to the initial temperature of 140° F. Hot water was supplied by a "Rex" gas-fired boiler operating in conjunction with a 150-gallon calorifier. The hot water supplied by the boiler circulated in the calorifier in counter-current to the clean washing water, which was thereby heated to 140° F. The reclaimed washing water, together with any make-up water required, was forced through the calorifier by a centrifugal pump having a duty of 120 gallons/hr., and giving a pressure at the washer inlet of 15 lb./sq. in. The pump was belt-coupled to a 0·75 squirrel-cage motor.

The water leaving the calorifier under pressure flowed direct into the washing machine. The soiled water was discharged from the base of this machine into a 60-gallon settling tank. A partition in this tank prevented larger refuse such as straw, paper, etc., from being carried forward. The upper part of this partition was perforated to allow the water to flow into a smaller compartment, from which it was drawn by the pump through a filter. The filter, which had a capacity of 200 gallons per hour, was so arranged that manipulation of the valves would permit fresh water from the mains to flush through it in the reverse direction in order to clean it periodically. The time required for cleaning the filter is only a few minutes per day.

From the filter the clean water passed through the pump and back into the calorifier, thus completing the circuit.

Labelling Machines

Although they have been engaged on war production work, the Purdy Patent Machinery Company, Ltd., have latterly been able to take stock of their products in the light of possible post-war needs, based on pre-war and war-time experience and due to the fact that their labellers have been playing their part in war-time production.

Essentials, including munitions, etc., that need labelling for identification or sealing in their containers, and products in other specialised spheres, are handled on Purdy machines, in addition to the regular range of foodstuffs, beverages, medicinal products in tins, glass, cartons, etc.

Purdy labellers will handle containers from the size of 1 c.c. ampoule to cans, bottles, boxes, etc., up to approximately 1 gallon or 1 litre capacity and labels within a square of 12 inches. They will affix labels in almost any position, singly or up to three or four together, irrespective of output.

The Purdy "Star" and "C.H. World Labellers" are at present on the "secret" list, with prototypes only in existence as yet, though they are designed with the backing of the knowledge gained in so many years of experience.

* * *

Partners in Industry

"We consider," said Mr. Joseph Hallsworth, General Secretary of the National Union of Distributive and Allied Workers, "that industry is a partnership affair." A simple statement of a fact that has always been true but not always recognised either by Labour or Capital.

Labour and Capital with Management form a partnership in which each is dependent upon the other and in which each has an identity of interest. But it must be a partnership in which each does all he can to promote its success. As a partner each must take his contribution and accept his share of responsibility; each must receive his share of the benefits; and there must be regular opportunities for the partners to meet and discuss their joint and individual problems.

The key to all this is industrial

co-partnership, the principle of which is not new, for it has been in successful operation in some industries for well over half a century, and is as vital and effective to-day as at any time in its history, states Industrial Co-Partnership Association. In other industries where its adoption has been more recent the results have been equally successful. Co-partnership leads to peace and harmony in industry.

* * *

Few Trawlers to be Released

Hopes that were earlier entertained up the Scottish north-east coast that a release of trawlers from Admiralty service could be rapidly switched back to fishing commercially are not encouraged by later news that none of the mine-sweeping trawlers is likely to be returned until after the war. This means that the fifteen trawlers which Aberdeen received, or is receiving, may form the entire total to be so far released and that there can be little hope of any mass release. A spokesman indicated that there would be an immense job of mine-sweeping post-war. These mines must be cleared for commercial shipping safety as well as for the safety of fishermen themselves, and no large-scale fishing could be contemplated while mines remained a lurking danger. The intention is, however, to release as many vessels for commercial fishing just as soon as they can be released. Interesting figures have meantime been given of the successful fishing season in this north-east area. Fraserburgh, veteran of whaling and sealing days, has netted £590,000 from the herring fishing and achieved the most successful year in history.

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United Glass Bottle Manufacturers, Ltd.

The directors of the United Glass Bottle Manufacturers, Ltd., announce that Mr. T. C. Moorshead, joint managing director, is retiring at the end of this year. Mr. H. J. Judd, joint managing director, has been appointed managing director of the company, effective as from January 1, 1945.

A Million Cases a Week

There is nothing of ill-health about this record, in spite of its medical implication; on the contrary, it is the eminently healthy achievement of the Container Recovery Service, which has been steadily increasing its weekly total of salvaged empty packing cases until now the number collected in one week has passed the million mark.

Early in the war Lever Brothers and Unilever, Ltd., foresaw a breakdown in the distribution of many rationed and essential commodities unless something was done to overcome the growing shortage of packing materials. The problem was solved by the formation of the Container Recovery Service, whose task it has been, on behalf of numerous manufacturers, to recover from wholesalers and retailers the boxes and cartons in which their supplies of such commodities as butter, margarine, household milk, soap, etc., have been delivered. In this way 140,000,000 outer containers have so far been collected and put into use again and again.

* * *

Commers for Civilian Usage

Introduced prior to the outbreak of war—in April, 1939—the Commer "Superpoise" range of six-cylinder vehicles, comprising five models with payload ratings of 1½, 2, 3, 4/5, and 6 tons, met with an excellent response among operators in every phase of road transport, and while the exigencies of war have necessitated concentration on vehicles of military type, "Superpoise" vehicles of the 2-ton and 4/5-ton types have, during the war, been available against Ministry of War Transport licence to acquire by firms in essential industries.

The most novel feature of the specification is the "Diaflex" mounting, the object of which is to free the cab, wings, radiator, and bonnet from the destructive stresses caused by "weaving." It consists of a pressed steel subframe, having as its patented feature a diamond suspension, giving four points of support on the chassis by special flexible anti-vibration mountings. One point is on the centre line of the chassis immediately under the radiator, and another, in the same plane, is just behind the back of the driver's cab. Approximately halfway between these two points, coincident with the line of the scuttle, are the two other supports, one on each frame sidemember. Main frame distortion produces a movement of the subframe which is in relation to ground level, and occurs in one plane only—namely, transversely across the frame at two points of the diamond suspension, the subframe as a whole being arranged to pivot freely on its longitudinal axis; that is to say, at the other two points of the diamond suspension.

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Brush Electrical Engineering Co., Ltd.

This company has set up a subsidiary company in South Africa under the title of Brush (South Africa) (Pty.), Ltd., P.O. Box 7995, 20, Bitcon Road, Johannesburg.

This subsidiary will initially build buses and coaches and certain electrical equipment in South Africa and will handle the sale of the following products of this company in the Union: Turbo-alternators, transformers, switchgear, motors, generators, traction equipment, Diesel electric locomotives, battery electric vehicles and trucks.

It will also superintend the distribution of Petter oil, paraffin and petrol engines in the Union.

* * *

Mr. A. de V. Leigh

On completion of twenty-one years as Secretary of the London Chamber of Commerce, Mr. A. de V. Leigh, M.B.E., M.A., has been presented with a cheque for £2,260 and a book containing the names of the 2,260 subscribers, each of whose subscriptions were limited to £1. The presentation took place at the Caxton Hall, Westminster, in the presence of a large gathering of members of the London Chamber, the gift being handed over by Mr. J. McLean, Chairman of the Council, in the absence through illness of Major-General Sir Evan Gibb, President of the Chamber.

Mr. F. S. Mitman, C.B.E.

Mr. F. S. Mitman, C.B.E., has joined the board of the Brush Electrical Engineering Company, Ltd. He is a graduate of Lehigh University, U.S.A. (Degree of Engineer of Mines, 1923). For a number of years he was associated with the light alloy industry, and since 1939 has held the following appointments:

1939-41, Director of Light Alloys and Magnesium (Sheet and Strip) Control, Ministry of Aircraft Production.

1940-41, Co-ordinator of Aircraft Supplies for Fighter and Naval Aircraft, Ministry of Aircraft Production.

1941-42, Adviser on Light Metals Fabrication, Ministry of Aircraft Production.

Since 1942, chairman and managing director of Messier Aircraft Equipment, Ltd., with which company he is retaining his connection.

* * *

That "Damned Cigarette"

During the course of the speech which she made at the opening of the Firemen Artists' Exhibition at the Royal Academy, Miss Ellen Wilkinson, M.P., Parliamentary Secretary to the Ministry of Home Security, said:

"There are a number of paintings of lull-time fires, which make many calls on the Fire Service and cause a great deal of damage—far too much in the circumstances. Reginald Mills's reconstruction of a fire in the Bombay Docks shows the havoc that was caused because someone threw a cigarette into the hold of a ship. In terms of money the loss has been estimated as high as 20 million pounds. An expensive cigarette, you will say, but the careless person who threw it does not bear the cost, and you cannot estimate in money the loss of the 900 people killed in the fire or the pain of the 2,400 injured, nor the loss in war production.

"A picture of farm ricks destroyed by fire shows the results of similar carelessness nearer home. I am sorry to say that farm fires have increased very considerably during the year. Sometimes the cause is machinery negligently handled, but nearly always it is that damned cigarette. Why will not people put their cigarettes out?

Society of Chemical Industry

The following is the syllabus for 1944-45:

October 2, 1944.—Chemical Society, Burlington House: Chairman's address, "Technics of Tin," Dr. R. T. Colgate, A.C.G.I., F.R.I.C.

November 6, 1944.—Chemical Society, Burlington House: "Use of Sensitised Metal in Engineering Design," Dr. A. Batley, B.Sc., A.R.I.C.

December 4, 1944.—Chemical Society, Burlington House: Joint meeting with Road and Building Materials Group: "The Constitution of Road Tar," E. J. Dickinson, B.A., B.Sc., A.R.I.C.

January 1, 1945.—Chemical Society, Burlington House: "Hydrogen Peroxide and Related Compounds in Industry," V. W. Slater, B.Sc., F.R.I.C., M.I.Chem.E.

January 18, 1945, 5 p.m.—The Royal Institution, Albemarle Street, W.1: Jubilee Memorial Lecture, "Paint—The Art and the Science," Dr. L. A. Jordan, A.R.C.S., D.I.C., M.I.Chem.E.

February 5, 1945.—Chemical Society, Burlington House: Joint Meeting with Food Group, "The Use of Amino Acids and Sugars for the Synthesis of Foods of Nutritional Importance," Dr. F. Bergel.

March 5, 1945.—Chemical Society, Burlington House, "The Printing Industry as a Field for Scientific Research," Dr. G. L. Riddell, F.R.I.C.

April 9, 1945.—Chemical Society, Burlington House, "Coal—Science—and the Future," Dr. A. Parker, M.Sc., M.I.Chem.E., F.R.I.C.

May 7, 1945.—Chemical Society, Burlington House: Annual General Meeting, "Phosphoric Acid and the Phosphates," S. Barratt, B.A.

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Victory Ex-Services Association

At a Mansion House meeting on October 2 was launched an appeal for funds to promote a scheme for the establishment of a headquarters, open to all ex-Service men and women of the British Empire (irrespective of rank, race, or religion), and of which Allied Naval, Military, and Air Forces may become honorary members when living in or visiting London after the war, as a permanent symbol of comradeship in war and fellowship in peace, and a place of reunion, remembrance, rest, and recreation. The scheme will incorporate and extend the amenities hitherto offered by the Veterans' Association and Allenby (Services) Club.

The project has the cordial good wishes of the Admiralty, War Office, and Air Ministry, and the active support of the British Legion.

Representatives of the three fighting Services, the British Legion, the Dominions and India, and ladies and gentlemen well known in public life have consented to serve on the council to administer the association.

The Victory (Ex-Services) Association Headquarters, in addition to the usual public rooms, lounges, etc., will contain entertainment rooms available not only for the many old comrades' associations, which before the war held their functions in the Allenby (Services) Club, but also for the very many more similar bodies which will need such accommodation after the war.

It is hoped to provide up to 300 bedrooms for ex-Service men, and some 100 similar rooms for ex-Service women. Facilities for endowing these bedrooms as memorials to the fallen will be open to relatives, regiments, associations, communities, and corporations.

A welfare and advice bureau, administered by the Association, will be established.

Negotiations are in progress for the acquisition of a freehold site in a central part of London.

The completed scheme, to fulfil adequately the demands that are anticipated, will cost approximately £1,000,000.

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Brush Foremen's Association

The Foremen's Association of the Brush Electrical Engineering Co., Ltd., recently held its second annual conference at the company's works.

In addition to Brush foremen, the delegates represented a number of important industrial concerns throughout the country. Mr. Alan P. Good, managing director of the company, presided at the dinner on the first evening, and in introducing the speaker, Sir Frederick Leggett, stressed that

the time had arrived for foremen to consider entirely new methods in control and management to stabilise post-war production. A change of heart is necessary if we are not to fall into errors of the past and the catastrophe of another war in twenty years' time. Mr. Good urged that the keynote of the convention would be found in service.

Sir Frederick Leggett, C.B., Deputy Secretary of the Ministry of Labour and National Service, said that as a Civil Servant he had many things in common with foremen, who had the task of carrying out the plans formulated by the "high-ups." The country owed a great debt to men of the foremen type, who had done a magnificent job in maintaining high production with flexibility during the war in the face of difficult labour conditions.

During the various sessions addresses upon the following subjects were delivered to the delegates:

"Economic aspects of post-war employment policy," by Dr. Maurice Dobb, Lecturer in Economics at Cambridge University; "Post-war developments in joint consultation," by Mr. L. H. Pearmaine, National Secretary of the Transport and General Workers Union; "The formation of a national institute of foremen," by F. J. Burns Morton, Works Manager, Sketchley Dyeworks, Hinckley (with discussion); "The philosophy of management," by Dr. J. A. Bowie, in charge of Research on Personnel Administration; "From hospital to industry," by Group Captain C. J. S. O'Malley, C.B.E., M.B., B.S., of the Royal Air Force Rehabilitation Unit, Loughborough.

* * *

Popularising Foreign Cuisine

What amounted to a veritable culinary adventure was embarked upon by the guests at a private luncheon party in Glasgow recently, which took place at the restaurant at Daly and Sons'. There was served a ten-course meal not only composed of unrationed foods, but those obtainable in the neighbourhood of Glasgow. Colonel J. F. Daly, managing director of the firm, thus initiated his campaign to popularise foreign dishes. The lunch consisted of musquatash, a concoction of corn and beans of Red Indian origin, followed by Hindu, American, Creole, Chinese, Spanish and Russian dishes. Pumpkin, roasted egg plants, tomatoes, pimentos, spinach, noodles, mushrooms and shredded chicken were a few of the ingredients. Colonel Daly aims at breaking down the traditional conservatism of our attitude to foreign dishes and proposes to serve a "world" menu in his restaurant every Saturday afternoon, the proceeds to go to charity.

* * *

A Macaroni Machine

Starting their food machinery with the background of years of research on drying and baking machinery, which technique is common to such different trades as textile, paper or even steel, the Spooner Dryer and Engineering Co., Ltd., developed a macaroni or spaghetti machine of the screw type illustrated below. The machine with the motor forms a complete unit, so that only the lightest foundations are necessary. The machine is very robust, the general outside lines are straight-formed and simple, so that the machine can be easily cleaned. As it has a high output necessitating a large screw, this is constructed in sections so that each section can be easily handled by female labour.

The machine is for producing macaroni cut into short lengths. One of its interesting points is a variable-speed drive fitted on to the knife which cuts the macaroni so that the length of macaroni can be raised at will while the machine is in motion.

Experiments are being made with a dough mixer which will automatically mix to a standard mixture the dough and elevate the flour, all being contained in one machine.

For the drying of macaroni the firm has been carrying out some fundamental research work. Generally speaking, the drying of macaroni has always been a long process, the longer the time taken in drying, the stronger and harder the product, and the consumer has become accustomed to this finish in macaroni. However, by drying more quickly it is claimed that the product, though more friable, cooks more quickly and absorbs the taste of the sauces, which gives a pleasanter food.

Messrs. Spooner have several drying machines for drying the macaroni, some of which dry in times which hitherto have not been approached.

* * *

Extruding Machine for Macaroni.

Overseas Items

U.S. Meat Supply is Assured

The United States is now in a position to assure most of the United Nations of a meat supply, according to a high official.

Referring to the Argentine, he said that the present time—the spring season—was a critical period for Argentine meat producers. Slaughtering had already started on a large scale. If the United Nations suddenly should decide to transfer all their meat purchases elsewhere, Argentina would find herself with enormous stocks of slaughtered meat on hand.

The possibility of this happening is enhanced by another aspect of the question, as officials have pointed out—the United States would be able and willing to furnish most of the meat on a Lend-Lease or credit basis, while Argentine mostly requires cash settlement.

It is held that should such action as is now contemplated be taken, General Farrell's régime would stand but little chance of surviving the economic depression that would necessarily ensue, as the result of the decision would dispense with Argentina meat exports for a certain time.—*Reuter.*

* * *

Dehydrated Peaches

Dehydrated peaches are the latest development from California. They have been developed by food technologists of the University of California.

When reconstituted the peaches resemble the canned product, say the experts, who add that in a few years nearly all cut fruits will be dehydrated in this manner.—*Reuter.*

* * *

Real Eggs for Britons

The promise of real eggs for Britons was made recently by Mr. Walter G. Blennerhasset, of the Dominion Department of Agriculture, at Montreal.

He said that agreement had been reached with Great Britain for the shipment of eggs in shell, and hundreds of thousands of dozens would soon be on the way. Canada previously supplied powdered eggs.—*Reuter.*

Food under Lend Lease

The *New York Times* reports that the Foreign Economic Administration is curbing the rights of war-time allies to acquire unlimited amounts of food under Lend-Lease.

As a step towards shifting international shipments to a cash-and-carry basis, the F.E.A. has terminated lend and lease for British sugar purchases in Cuba. The paper says that this was disclosed by the American Institute of Food Administration, which added: "The F.E.A. has announced that the test would be whether the food was actually needed for war purposes. Britain recently had refused delivery of some surplus jams and jellies when told that they would be shipped only on a cash basis. The F.E.A. insisted during the current conversations with Lord Keynes that the operation of Lend-Lease from now on should be more business-like. One result of this may be that later British flour demands will be filled with Canadian wheat.

"The F.E.A. takes the stand that food transactions of a commercial nature should be treated as commerce and that in that way sound foundations for post-war trade can be prepared."—*Reuter's Trade Service.*

* * *

Canada's Industrial Progress

The astonishing industrial progress made by Canada during the war is discussed in a pamphlet entitled "Will there be Post-War Jobs?" written by Mr. Leonard Marsh, a prominent Canadian economist, who presented Canada's equivalent to the Beveridge Report to the Canadian Government.

The author reveals that in 1939 industries in Canada employing more than 15 employees provided work for 600,000. In 1943 this number had doubled.

The chemical industry rose by 340 per cent., and iron and steel by 273 per cent. In a period of four years Canadian industry manufacturing developed as much as in twenty-five normal years.—*Reuter.*

Purification of Substances by Slow Fractional Freezing

Two techniques for purifying substances by slow fractional freezing are described by F. W. Schwab and E. Wichers (*Journal of Research of the National Bureau of Standards, June,* 1944). The first involves the slow lowering of a cylindrical cell, filled with the fused substance, through a heating coil in such a way that freezing begins at the bottom and progresses upward, as the cell emerges from the coil, until the whole mass has solidified. The solidified column, tube and all, is cut into the desired fractions.

The second technique, which is suitable for larger quantities, affords better control of the rate of freezing and provides a larger solid-liquid surface for a given quantity of material. A spherical flask filled with the liquid is cooled at a controlled rate in such a way that freezing begins at the wall of the flask and proceeds inward at a regulated slow rate until the desired fraction has solidified, after which the remaining liquid is siphoned out of the flask. The purification of benzoic acid was much more rapid by this method than in earlier trials by crystallisation from solvents.

* * *

Peanut Experiments

Ross L. Holman, writing in the October 15 issue of *Forbes' Magazine,* a fortnightly business publication, told of triumphs made in the field of scientific research with the peanut. "Ten years ago the peanut was something to eat. To-day we use it to eat, to wear, to paint houses, as medicinal aid for cosmetics and as an explosive." Holman pointed out that peanuts are used in some items commonly known to contain nut oils—salad oil, oleomargarines, peanut butter, confectionery, meat substitutes—and it is now successfully replacing rare olive oil and cotton oil in the manufacture of mayonnaise and salad dressings. It is also being milled into flour and meal. Holman stated that the fighting forces are carrying peanuts in their rations,

for nuts have been found to possess enough nutritional value to be a substitute for bread. This little nut can be spun into fibre that wears as well as wool.

Experiments in this field have been conducted at the United States Southern Regional Laboratory at New Orleans, Louisiana, under the direction of Dr. K. S. Markley. Also brought out here is a ground peanut shell product that does a fine job on cleaning carbon from the Allies' aircraft engines. Another product almost unknown since the beginning of the war for which peanut hulls will soon be a substitute is cork.

Shells can also be processed into fuel, bedding and plastics. A promising market for peanut meat itself is adhesives, especially in the field of gummed tape. Dr. Markley says peanut protein glues have recently been used experimentally and gave complete satisfaction. Peanut oil makes a fine lubricant for machinery and can be used in the finest watch. It is used in paints, shaving cream, drugs, soaps, shampoos and nitro-glycerine. The oil can even be used in the treatment of infantile paralysis.

* * *

60,000,000 Oranges for Marmalade

Britain is to get 200,000 cases of bitter oranges for marmalade and 100,000 cases of onions between now and the end of the year. This is equivalent to about 60,000,000 oranges, worth over £200,000, and 30,000,000 onions, worth more than £100,000.

The contract was signed on behalf of Britain by a representative of the U.K. Commercial Corporation.

There is an option on the onions contract for an increase up to 250,000 cases.

Shipment will be made in British ships.—*Reuter.*

* * *

Sweden's Margarine Output

Sweden produced 37,000 tons of margarine in 1943, requiring 31,000 tons of oil, it is announced in Stockholm. Forty-two per cent. of the margarine was home-produced. Sweden's pre-war average margarine output was 60,000 tons.—*Reuter.*

OBITER DICTA

English apples need a publicity campaign.—*Dr. H. V. Taylor, Horticultural Commissioner to the Ministry of Agriculture.*

● The Government is spending £30,000 a year in advertising to help people become better gardeners.—*Mr. Donald McCullough, Public Relations Officer to the Ministry of Agriculture.*

● Is it not a fact that officialdom and bureaucracy will be very slow and loth to give up the control they have over almost every aspect of our lives?—*Sir Leonard Lyle.*

● The dough is but a child in the cradle, mothered and nursed to grow in volume and character, with the beneficial assistance of that mechanical parent, known to us as the fermentation room. But it is a wise child that knows its own father. Today, two parents claim this child.—the "Fermentation Room" and the "Low Cabinet."—*Fred D. Pfening, Columbus, Ohio.*

● I write to ask if you would give permission to engrave on the back of the stone Wilson in Dryfesdale Cemetery the following particulars:

"Farm fare: porridge and milk (skim) a.m. and p.m.; eggs at Easter. No oranges, tomatoes and vitamins, etc."

The object of this record is to show that folk can live to a good old age without having food rich in vitamins.

Ages: One over 90, four over 80, two over 70, two over 80 still living.—*Application received by Lockerbie (Scotland) District Council from a Mr. G. Wilson.*

● Here in the heart of a cheese country we fare no better than elsewhere. The other day I happened to be in a small grocer's shop and saw a most delectable-looking half-cheddar. I remarked on its merits to the grocer, who astonished me by replying: "Yes, it's a fine cheese—it's condemned." This fine specimen, which would have been welcome on the side-table of any West End club, was too "crumbly" to divide profitably into the minute "dominoes" which constitute individual rations and was returned to the wholesaler!—*F. A. S. McClelland, in a letter to "The Times."*

U.S. Comment on Cocoa Controls

The *Journal of Commerce* publishes an open letter by Mr. Isaac Witkin, President of the New York Cocoa Exchange, addressed to the cocoa industry of the United States, to the State Department and other Government agencies administering cocoa, as well as to the British Government, which, the newspaper says, reflects "grave trade apprehension over the proposed British plan for continued post-war cocoa control."

The letter declares that British cocoa control looms up after the end of the war, in which case "chocolate interests throughout the world, including the United States, would come under the domination of such a trust."

The letter says that Brazil, Venezuela, Santo Domingo, Ecuador, the island of San Thome, and Trinidad are among the many countries interested in the cocoa question.

Commenting in an editorial on the British White Paper urging the continuation of Government controls on cocoa after the war, the paper says: "Actually the elimination of price functions in the post-war era would introduce such a high degree of rigidity in the control of a commodity such as cocoa that the ultimate effect of such a scheme would be detrimental to consuming countries as well as producing countries. Government controls of this inflexible type encourage the accumulation of excess stocks until finally a drastic readjustment between demand and supply becomes inevitable. This almost certainly is accompanied by a period of serious price confusion and heavy losses for the producing countries. Thus it would seem that post-war controls as now proposed for cocoa by British interests involve serious disturbances for consuming countries as well as for producing interests."—*Reuter.*

* * *

Uruguayan Eggs for Britain

A recent Uruguayan decree increases the number of eggs to be exported to Great Britain by 30,000 boxes. Previously the exportation of 50,000 boxes had been authorised.—*Reuter's Trade Service.*

News from the Ministries

International Wheat Council

The Executive Committee of the International Wheat Council met at Washington on October 19 to review world conditions in relation to the Wheat Relief Pool.

The establishment of an international price was also discussed.

The members of the Council are: Argentina, Australia, Canada, the United Kingdom and the United States. The Council was formed as the result of a memorandum agreement signed in 1942, and it has been meeting several times a year.—*Reuter.*

* * *

New Zealand Rabbits for Great Britain

Speaking about the scheme of sending 2,500,000 rabbits to Great Britain by the end of this year, Mr. Parry, New Zealand Minister for Internal Affairs, said that the rabbit export industry existed before the war with an average of 1,250,000 being exported annually during the five years 1936-1940. During the three years 1941-1943, due chiefly to shipping difficulties, the numbers exported had fallen to an average of less than 500,000, most of which had been canned.

The Minister declared that a freezing works situated in the heart of the Central Otago, which had been used exclusively for cold storage of fruit during the war, had been enlarged by the erection of rabbit-packing works and skin-drying plant, and four rabbit-collecting vehicle services had been established. Mr. Parry said that in the present circumstances rabbits should be regarded primarily as meat for Britain. It was proposed, he added, to exploit the possibility of securing hares for export to Great Britain, which are very numerous in some parts of the South Island. He said that a small number of hares was to be placed on local markets to ascertain their popularity, and if results justified it considerable supplies would be made available, which should help to offset the shortage of rabbits. A small number of hares should also be canned. Provided the demand existed and the product could be sold at a price which would cover costs, that avenue of utilisation would be further developed.—*Reuter's Trade Service.*

The Labelling of Food Order: New Dates of Operation

In view of the difficulties experienced by manufacturers in obtaining new supplies of labels and packaging material, the Minister of Food proposes to postpone the date of operation of the Labelling of Food Order (S.R. & O. 1944 No. 788) in respect of sales by wholesalers and retailers, so as to give manufacturers and packers up to December 30, 1944, to comply with its requirements. Wholesalers will be given three months and retailers six months after January 1, 1945, to clear stocks of products the labels of which do not comply with the Order. It should be noted that wholesalers and retailers selling foods prepared by themselves must comply with the Order on and after January 1, 1945. It should also be noted that after that date it will be an offence to publish any advertisement in which the presence of vitamins or minerals is claimed unless the requirements of the Order are complied with.

* * *

Labelling of Margarine

In order to comply with the Labelling of Food Order (S.R. & O. 1944 No. 780), amended wording will be included before the Order comes into force on the wrappers of all margarine reaching the household consumer (other than Kosher/Vegetarian margarine), which will read: "Containing 450-550 I.U.s Vitamin A per oz." The Ministry takes every care that all margarine of this type should contain 550 I.U.s of vitamin A per oz. It is, however, recognised that under the abnormal storage conditions necessary in war-time there may be isolated instances in which some small loss of potency may occur, and the amended wording is designed to guard traders against this eventuality.

In the case of Kosher/Vegetarian margarine, the normal means of vitaminisation cannot be adopted, and with the means at the Ministry's disposal it is not practicable to achieve a greater potency than 300 I.U.s per oz. In order to protect the trader, the following statement will appear on the wrapper: "Containing 200 to 300 I.U.s per oz."

The vitamin D content of all margarine is 60 I.U.s per oz., and there is no risk in the case of vitamin D of loss of potency due to abnormal storage conditions.

* * *

Labelling of Food Order Exemption

Where a pre-packed food is wrapped in more than one container and the labelling on the inner container is not clearly legible through the outer wrapper, the Labelling of Food Order (S.R. & O. 1944 No. 788) requires a label to be printed on or attached to both wrappers.

The Minister of Food has decided to amend the Order, however, to permit the use of a plain liner to an outer wrapper in which the product is sold unopened, provided the use of such a liner, which would not normally be removed from its outer wrapper during use, is essential to the proper protection of the product.

* * *

Soya Beans and Soya Bean Products

For the purpose of the new Cereals and Cereal Products (Licensing and Control) (Dealings Abroad) Order (S.R. & O. 1944 No. 1035), which came into force on October 15, 1944, soya beans and soya bean products are classified as cereals and cereal products. It is a requirement of the Order that except under and in accordance with the terms and conditions of a licence or authorisation granted under the Order, no person shall buy or sell any cereal or cereal product situate outside the United Kingdom. The Oil Seeds, Vegetable Oils and Fats and Marine Oils (Control) Order (S.R. & O. 1939 No. 1371) also prohibits trading in soya beans outside the United Kingdom except under licence.

From October 15 soya beans and soya bean products were therefore included for administrative purposes under both the

Orders referred to above, but the Ministry of Food will not require any person to be licensed under both Orders. No application need be made by any person already in possession of a licence granted under the relative Oils and Fats Order.

* * *

Mr. M. I. Hutton, C.M.G.

Mr. M. I. Hutton, C.M.G., Deputy Secretary, Ministry of Food, has been appointed head of the United Kingdom Food Mission to North America in succession to the Hon. R. H. Brand.

Mr. M. I. Hutton has been a member of the Mission since it was first established in Washington in 1941.

* * *

Pre-Packed Food Colourings

The Ministry of Food has had under consideration the manner in which the ingredients of prepacked food colourings should be disclosed for the purposes of the Labelling of Food Order (S.R. & O. 1944 No. 738).

The Order, as issued, requires that labels of food colourings prepacked for sale as such shall disclose the identity of the colouring ingredients with which they are made. In view of the difficulties in applying this requirement to colourings prepared with synthetic dyes, it has been decided that before the Order comes into force an amendment will be made providing that the identity of the dye or colour ingredient need not be disclosed. It will be sufficient to disclose the ingredient as "colour" without further specification as to composition, except that where the colouring is of synthetic origin the word "colour" must be qualified by either "synthetic" or "artificial."

The appropriate disclosure in the case of a solution of a synthetic colour would, therefore, include "synthetic colour" or "artificial colour," together with the ingredients of the solvent (or, in the case of an aqueous solution, "solution of synthetic colour" or "solution of artificial colour"). The name of the dye may, of course, be given in addition if desired.

Where the colour is not of synthetic origin, the disclosure may show either the identity of the colouring ingredient—*e.g.*, "burnt sugar" or "caramel"—or simply "colour," together with the other ingredients of the preparation (or, in the case of an aqueous solution, "solution of colour" or, for example, "solution of burnt sugar").

* * *

Lieut.-Colonel F. C. C. Balfour, C.I.E., C.B.E., M.C.

Lieut.-Colonel F. C. C. Balfour, C.I.E., C.B.E., M.C., has resigned his appointment as Divisional Food Officer for the Midland Division on taking up service under U.N.R.R.A.; he left the service of the Ministry on October 25, 1944.

Colonel Balfour has served under the Ministry of Food since the outbreak of war. He was appointed Divisional Food Officer for the Midland Division as from January 18, 1943.

The Minister wishes to place on record his appreciation of the valuable services Colonel Balfour has rendered to the Ministry in the various offices which he has held.

Colonel Balfour will be succeeded as Divisional Food Officer, Midland Division, by Sir Eyre Gordon, C.S.I., C.I.E.

* * *

Resignation of Mr. G. H. E. Parr

Mr. G. H. E. Parr, M.B.E., Divisional Food Officer for the Northern Ireland Division, has been recalled to the Northern Ireland Civil Service and left the service of the Ministry on October 22, 1944, after having served since the outbreak of war as Divisional Food Officer.

The Minister wishes to place on record his appreciation of the valuable services which Mr. Parr has rendered to the Ministry during these years.

Mr. J. R. Walker, Deputy Divisional Food Officer in the Northern Ireland Division, has been promoted to fill the vacancy, with effect from October 23, 1944.

Mr. M. R. R. Vidal, Deputy Divisional Food Officer in the South-Eastern Division, will be promoted to the post of Divisional Food Officer for that Division as from October 26, 1944.

Nuts Exempted from Sector Scheme

The Food (Sector Scheme) Order S.R. & O. 1943 No. 1675 has been amended (S.R. & O. 1944. No. 1198) so that the provisions of the Order shall not apply to nuts on and after November 1, 1944.

* * *

Admixture of Imported Flour

As from October 16 the rate of admixture of imported flour was increased in all areas, except Northern Ireland, from 5 per cent. to 7½ per cent. In Northern Ireland the rate of admixture will be increased from 5 per cent. to 10 per cent.

* * *

Butter Fat

The Ministry of Food announces that on and after December 10 the issue of butter fat as part allocation for the production of flour confectionery will be discontinued, and the 10 per cent. at present issued in the form of butter fat will be replaced by other fats.

* * *

Surplus Apple Pulp

The Ministry of Food announces that supplies of apple pulp are available for purchase under licence by caterers, bakers, flour confectioners, chocolate and sugar confectioners, and licensed pickle and sauce manufacturers.

Applications for licences should be made:

(*a*) By caterers, chocolate and sugar confectioners, to the Ministry of Food, Catering Division, Mount Stewart, Colwyn Bay.

(*b*) By bakers and flour confectioners, to the Ministry of Food, Flour Confectionery Branch, Bryn Euryn, Colwyn Bay.

(*c*) By pickle and sauce manufacturers, to the Ministry of Food, Pickles and Sauces Section, St. John's College, Oxford.

Licences will be issued under the Fruit Pulp Order, 1944 (S.R. & O. No. 798), and will permit of sales to holders of licences by licensed pulpers and preservers, without restriction as to quantity.

Information and Advice

Acetylmethyl Carbinol

9,474. *Required, information as to the usefulness of, and the method of using, acetylmethyl carbinol in the manufacturing of essences and other aromatic commodities.* (London.)

Acetylmethyl carbinol (also known as "acetoin") occurs in butter and together with diacetyl is probably responsible for the aroma and flavour.

It melts at 15° C. and boils at 148° C. It has been prepared by the action of the acetic acid bacteria on propylene and butylene glycols, and is made by the reduction of diacetyl. It polymerises on keeping.

The only use we know of is as a butter flavouring essence, but by itself it does not seem to be entirely satisfactory for the purpose. There appears to be very little about its use in the literature.

Chocolate Blancmange Powder

9,572. *Required, formula for a chocolate blancmange powder.* (Eire.)

The following formula is given as a basis for trial. There are, of course, a host of recipes, but the main ingredients are cornflour and chocolate powder.

For a powder to make a quart of blancmange, 4 oz. of cornflour and ½ oz. chocolate makes a good product. To this quantity a pinch of salt is added and sufficient vanilla (or other flavouring essence) to taste. For each quart of blancmange 4 oz. of sugar is recommended, but presumably you would be making up a sugarless powder, leaving the consumer to add this. Half an oz. of the cornflour may be replaced by the same quantity of powdered gelatine (quantity of gelatine depends on the quality of same), which ensures a stiffer product. You would need to make some trials in order to establish the effects of the particular grades of material you are using.

The instructions for making the powder would be: Moisten the powder with a little cold milk. Boil the remainder of 1 quart of milk and pour on to the moistened powder. Wet a mould with cold water and pour in mixture. When cool turn out.

Soluble Solids in Mincemeat

9,606. *Required, information regarding the determination of soluble solids in mincemeat. The enquirer has a direct-reading refractometer.* (London.)

The recent Statutory Rule and Order, 1944, No. 842, lays down that the minimum figure for soluble solids is 65 per cent., and defines soluble solids as meaning "the percentage by weight of soluble solids ascertained by a refractometer when the product is cold, no correction being made for insoluble solids."

The conversion of refractive index to soluble solids is usually based on an internationally accepted table of refractive indices of sucrose solutions at 20° C. (68° F.), and your direct-reading refractometer is undoubtedly calibrated in this way. The Order does not mention any corrections for soluble substances other than sucrose, and presumably they can be neglected.

The usual means of taking a reading is to mince and mix thoroughly a representative portion of the mincemeat and to squeeze some syrup from this through a small piece of muslin. This syrup is then placed on the prism of the refractometer and a reading taken in the usual way. The figure is reported, for the purposes of the Order, as per cent. soluble solids. It is evident that the figure does not represent the true percentage of soluble solids. To obtain this, corrections would have to be made for the effects of other soluble constituents and for insoluble matter.

Information Supplied

9,433. *Name and address of a firm supplying machines for mincing mint for mint sauce.* (Australia.)

9,434. *Names and addresses of firms making retorts, sealing machines and vacuum plant for canning.* (Derbyshire.)

9,437. *Names and addresses of firms supplying plant or apparatus for the manufacture of dehydrated soup and soluble coffee powder.* (London.)

9,443. *Particulars of firms of engineers specialising in the manufacture of plant for producing potato crisps.* (London.)

9,457. *Particulars of firms supplying vacuum cleaners for mills.* (Eire.)

9,458. *Particulars of firms supplying machinery for the production of pickles and sauces.* (India.)

9,468. *Particulars of firms supplying machines for making spaghetti.* (London.)

9,469. *Particulars of firms supplying machinery for food dehydrating factories.* (Egypt.)

9,475. *Information on the use of essential oils in the flavouring of meat products.* (Scotland.)

9,476. *Particulars of firms interested in machinery for the manufacture of cardboard.* (S. Africa.)

9,482. *Particulars of firms supplying perforating machines.* (London.)

9,484. *Information regarding the composition of meat cubes and gravy salt.* (Eire.)

9,497. *Name and address of a firm supplying a machine for cleaning onions.* (S. Africa.)

9,500. *Information regarding the specific gravity of apple juice and sugar syrup.* (N. Ireland.)

Information Required

9,652. *Manufacturers of margarine and biscuits seek suggestions on any food products suitable for the British fighting Services. Also formulæ for different kinds of biscuits (excluding the usual Service biscuit) that would be most popular in canteens, etc., that will be established for the British troops in Australia.* (Australia.)

9,621. *What are the raw materials and the type of plant used for the manufacture of synthetic liquid milk?* (Eire.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

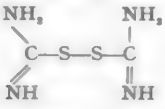
Abstracts of Recent Specifications

Improvements Relating to the Preparation of Dough and Bread

This invention relates to the preparation of dough, and has for its object the possibility of the production of fermented baked goods of improved quality.

The improving effects of certain oxidising agents and oxidation-reduction systems on dough and bread are well known. Examples of substances which produce these effects are potassium bromate, ammonium persulphate, ascorbic acid, alloxan and dialuric acid.

According to the present invention, a small quantity (not exceeding 0·05 per cent. by weight of the flour) of a salt of dithioformamidine,



is incorporated with the flour or other ingredients of a dough batch before or during mixing of the dough, which is thereafter fermented and baked into bread, buns or the like.

This results in the production of bread, buns or the like of enhanced volume, and improved crumb colour, texture and softness. This improvement is particularly noticeable in bread from doughs fermented in bulk for short periods such as one hour.

549,903. The British Arkady Co., Ltd., Walter Percy Ford and Alan Mulock Maiden.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

561,903. National Oil Products Co.: Production of vitamin concentrates.

561,961. Booér, J. R. and Berk and Co., Ltd., F. W.: Means for preventing destruction of grain by insect pests.

591,966. Isherwood, F. A.: Preservation and storage of perishable materials.

561,970. Forrester, H. J. C. (McCauley, C. V.): Apparatus for peeling potatoes and for removing surface layers from other objects.

562,002. Nicoresti, G. Cofman-.: Process for manufacturing citrus preparations such as lemon, orange and/or grape fruit juices, preserving their full vitamin potency.

562,015. Roche Products, Ltd.: Process for the manufacture of trihydroxy abietic acid.

562,038. British Rema Manufacturing Co., Ltd., and Davis, J.: Apparatus for simultaneously separating and cooling fine pulverulent material.

562,059. Lawton, G.: Removal of astringent substances from cocoa.

562,123. Inredeco, Inc.: Method of preparing a cocoa extract.

562,201. Head, Wrightson and Co., Ltd., Wrightson, Sir T. G., and Fisher, R. C.: Tubular apparatus for heating liquids.

562,359. Paper Cap Manufacturing Co., Ltd., and Robinson, K. A.: Closures for bottles, jars, and like containers.

562,470. Stokes Machine Co., F. J.: Method of and apparatus for desiccating liquid and semi-solid materials.

562,477. Kigass, Ltd., and Haerle, H. R.: Means for controlling the flow of liquids.

562,485. Autopack (London), Ltd., Lee, G. A., Smith, A. R., and Hopkins, C. J.: Automatic packing-machines.

562,516. Fiddes, J.: Containers for bottles, jars and the like.

562,518. Turley and Williams, Ltd., Smith, C. D., and Otton, D. H.: Gas or other cookers or the like.

562,554. Burrage, F. C.: Bread-making process.

563,451. Co-operative Wholesale Society, Ltd., and Green, J. E.: Manufacture of compound fats, lard substitutes and the like.

562,559. Morris, Ltd., B. O., and Morris, E. M.: Milling-machines.

562,634. Morris, J. N., and Kent, R. L.: Refrigerating apparatus.

562,639. Farfan, F. T.: Grinding mills.

563,677. Dixon, M. G. (Buhler Bros.): Preparation of cereal grain for milling purposes.

563,525. Carlsson, E. A.: Method of preserving fruit and vegetables.

563,527. Wilson, G. D., Hart, J., and Baker Perkins, Ltd.: Dough brakes and the preparation of dough for biscuit-cutting machines and the like.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

BANKER.—628,604. Sponge cakes and preparations principally of flour for use in making cakes. **Alfred William Cheesman and Len Pratley**, trading as **Cheesman and Pratley**, 254, York Way, London, N. 7, Manufacturers.

AURORA. — 628,774. Flavouring essences other than essential oils. **The London Essence Company, Limited**, 53, Glengall Road, Peckham, London, S.E. 15, Manufacturers.

MARIGOLD.—628,775. Flavouring essences, other than essential oils. **The London Essence Company, Limited**, 53, Glengall Road, Peckham, London, S.E. 15, Manufacturers.

STARBUD. — 628,805. Chocolates, sweetmeats and confectionery (none being medicated). **Jack Bottomley** and **Mary Edna May Bottomley**, trading as **J. and M. E. M. Bottomley**, 434, Hessle Road, Hull, Wholesalers and Retailers.

DALE.—628,916. Bakers' dusting flour. **Joseph Heap and Sons, Limited**, 2, The Temple, Dale Street, Liverpool, Rice Millers and Merchants.

New Companies

Bake-a-Cake, Limited. (388734.) 61, Poolstock, Wigan. To carry on bus. of millers, bakers, etc. Nom. cap.: £500 in £1 shares. Dirs.: G. Thompson, 24, Spender Road, Wigan; Mrs. A. Thompson, of same address.

J. J. Moore (London), Limited. (389323.) 378, North Circular Road, Palmers Green, N. To take over bus. of a wholesale food distributor, egg merchant and packer, carried on by Joseph J. Moore at Palmers Green, N. Nom. cap.: £10,000 in £1 shares. Dirs.: J. J. Moore and Mrs. H. M. Moore, both of Springfield, Wagon Road, Hadley Wood, Herts; R. F. Lees, "Wychwood," Onslow Avenue, Cheam.

Nordic Fishing Company, Limited. (389430.) Baltic Exchange Chambers, 24, St. Mary Axe, E.C. 3. Nom. cap.: £10,000 in £1 shares. Dirs.: To be appointed by subs. Subs.: C. G. Shaw, 85, Greenway, Chislehurst, Kent (clk.); F. T. Drury, 25, Pasquier Road, Walthamstow (clk.).

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To our friends, old and new, we extend the Season's Greetings and all Good Wishes for the coming year

BUSH

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HIGH-HATTING IT!

Dirty Work. An eight-hour shift cleaning railway engines is this young lady's Sunday work. She makes tanks during the week. You can bet that she *wants* and *gets* an overall that won't shrink in the wash!

What's Cooking? Hot pennies given as largesse, and "cooked" by a very high-hat chef, are an age-old Welsh custom. Overalls "Rigmel"-Shrunk are fast becoming a new custom. Last year, more than 6,000,000 garments carried the "Rigmel"-Shrunk label. A lot of overall wearers have found that the "Rigmel" label is their security of satisfaction.

WAR VICTIM

Your customer can "take it" but maybe his wartime shirt can't. Still, even if shirts do shrink so that he can't give full voice to "Rule Britannia," it is soothing to remember that after the war all his shirts can be "Rigmel"-Shrunk shirts. Then he'll enjoy the comfort that wearers of "Rigmel"-Shrunk overalls are getting.

A FEW OF THE SUPPLIERS WHO RECOMMEND "RIGMEL"-SHRUNK

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Fleming, Birkby & Goodall Ltd., Halifax.
Richard Lunt & Co. Ltd., Birmingham, 4.
S.W. & W.E. Standard Mfg. Co. Ltd., Cardiff.
*World's Wear Ltd., Birmingham, 12.
F. Fryer & Co., London, S.W.11.
Neil Meiklejohn & Co. Ltd., Glasgow, S.E.
The Standwear Manufacturing Company Ltd., Wigan.
F. H. Bassett & Sons Ltd., E.3.
The Jayess Clothing Co. Ltd., Gateshead-upon-Tyne.
Nicholls & Co. (Chiswick) Ltd., Richmond, Surrey.
James Varley & Co. Ltd., Nelson, Lancs.
*Booth & Fielding Ltd., Sheffield, 1.
J. Rotherham & Co. Ltd., London, E.1.

*Specialists in Women's Wear.

"Rigmel"-Shrunk
REGD.

LAUNDRY-TESTED AGAINST SHRINKAGE

British Standard 1118-1943

ADVERTISEMENT OF THE BRADFORD DYERS' ASSOCIATION, LIMITED, MANCHESTER, BRADFORD, LONDON

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Post-war Cartons & Designs

Are you, like other manufacturers and users of cartons, thinking of your packaging problems after the war? Have you already some ideas on the subject? If so, our Studio and design Dept. are at your service to help in putting those ideas on to paper, or in the form of the right carton.

Cartons and Printing for all purposes

HUNT PARTNERS LTD. CLAPTON · LONDON · E.5

BENJAMIN LIGHTING DATA 6

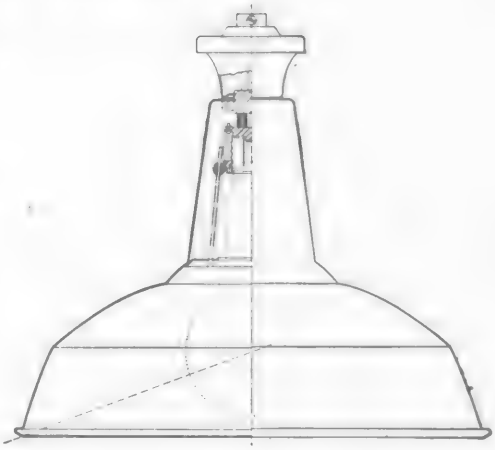
BENJAMIN FITTINGS ARE MADE TO KEEP BRIGHTNESS OF VISIBLE PARTS WITHIN APPROPRIATE LIMITS

I CUT OFF prevents a direct view of the lamp filament at normal angles of vision.

II SIZE must be sufficient so that the reflecting surface shall not be too bright.

III REFLECTING SURFACES must be chosen so that they do not reflect bright spots into the eye.

IV VISOR GLASS FRONTS besides keeping out dirt can be supplied with frosted or opal glass to diffuse the light.



★ This is No. 6 of a series of data sheets. Paper restrictions prevent our publishing all of them here but we will gladly send you copies of the rest.

BENJAMIN

THE BENJAMIN ELECTRIC LIMITED

Brantwood Works, Tottenham, London, N.17

Telegrams: "Benjalect, Southtot, London" Telephone: Tottenham 5252 (5 lines)

LIGHTING APPLICATION BY BENJAMIN ENGINEERS

Keep 'em sticking out

Flaps, we mean—on collapsible fibre-board cases, before you return them. We're grateful for the kindly thought, but they all have to be *un*-tucked before they can be used again. So *please* collapse them flat—*with flaps sticking out!* Thank you.

Remember, cash is paid for all usable cases at time of collection. No book entries! No credit notes! Vans collect during normal deliveries. C.R.S. vans provide regular additional service every 3-4 weeks.

PLEASE open cases carefully. Don't break wooden lids or tear fibre-board flaps.

ALLOWANCE CARD, giving full details of prices, on application.

open carefully
keep them clean

C·R·S

sort them out
have them ready

Authorised Collectors of empty containers for Margarine, Compound Cooking Fat, Lard, National Household Milk (M.O.F.), and for many leading Food, Soap, Toilet and Household Product Manufacturers.

CONTAINER RECOVERY SERVICE

S.P.D. LIMITED

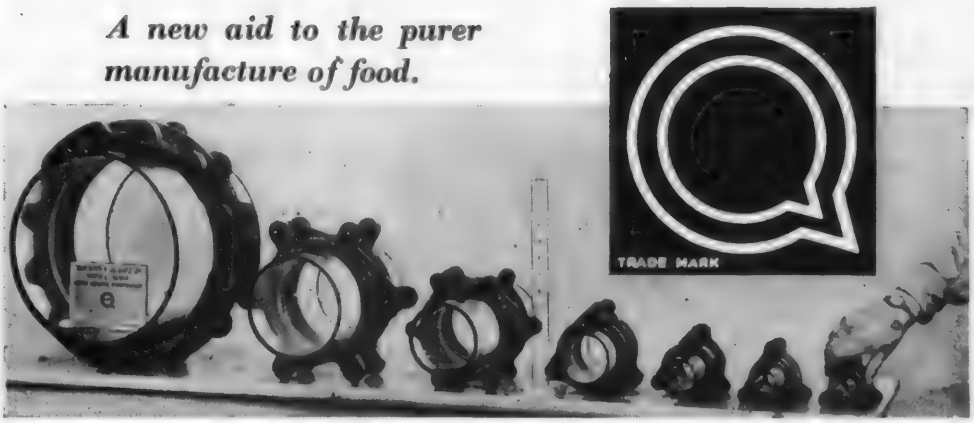
UNILEVER HOUSE, BLACKFRIARS, LONDON, E.C.4

Telephone: Central 7474

Telegrams: Spedeco, Telex, London

CRS 8-146

A new aid to the purer manufacture of food.



Showing you a range of Quickfit glass pipe sizes for use in food manufacturing installations

QUICKFIT
All Glass
CHEMICAL PLANT

- The use of All-glass plant enables laboratory conditions of purity and cleanliness to be maintained on the production scale in food manufacture. That the plant is clean at the commencement of production and at changeover from one process to another, can be assured by visual inspection.
- The transparency of glass equipment readily enables plant control to be effected visually. Contents and internal processes can always be observed by the mere act of looking. You achieve a degree of purity and clarity of working that cannot be obtained by any other means.
- The photograph at the head of this shows you a range of "Quickfit" Glass pipe sizes which are used in the construction of "Quickfit" Industrial Glass plant.
- Will you not give "Quickfit" Technical Staff the opportunity of submitting suggestions, designs and prices for your particular needs? Enquiry commits you to nothing, but may well disclose the means of considerably increased manufacturing facility which can help you to better products.

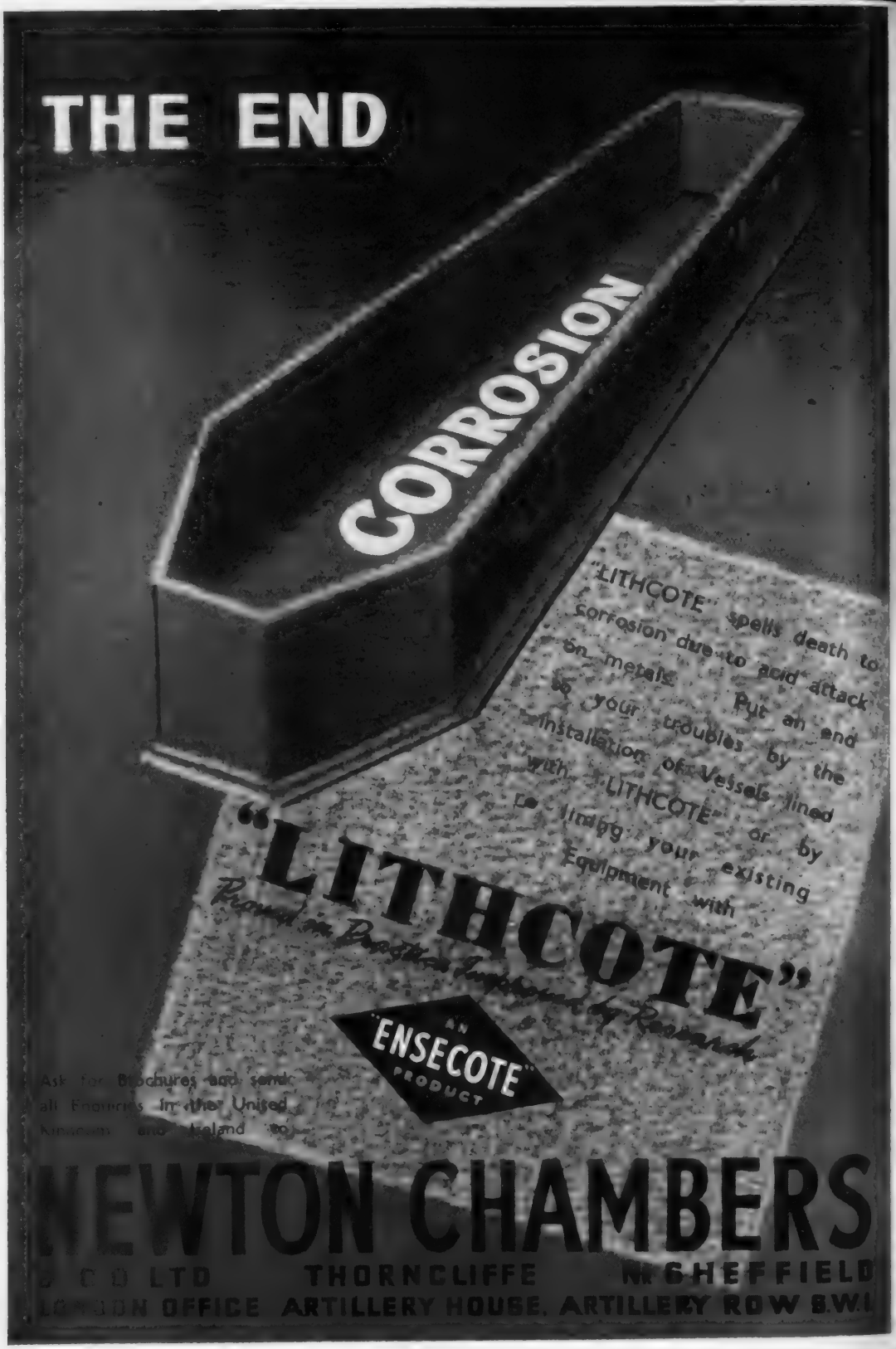
QUICKFIT & QUARTZ Ltd.

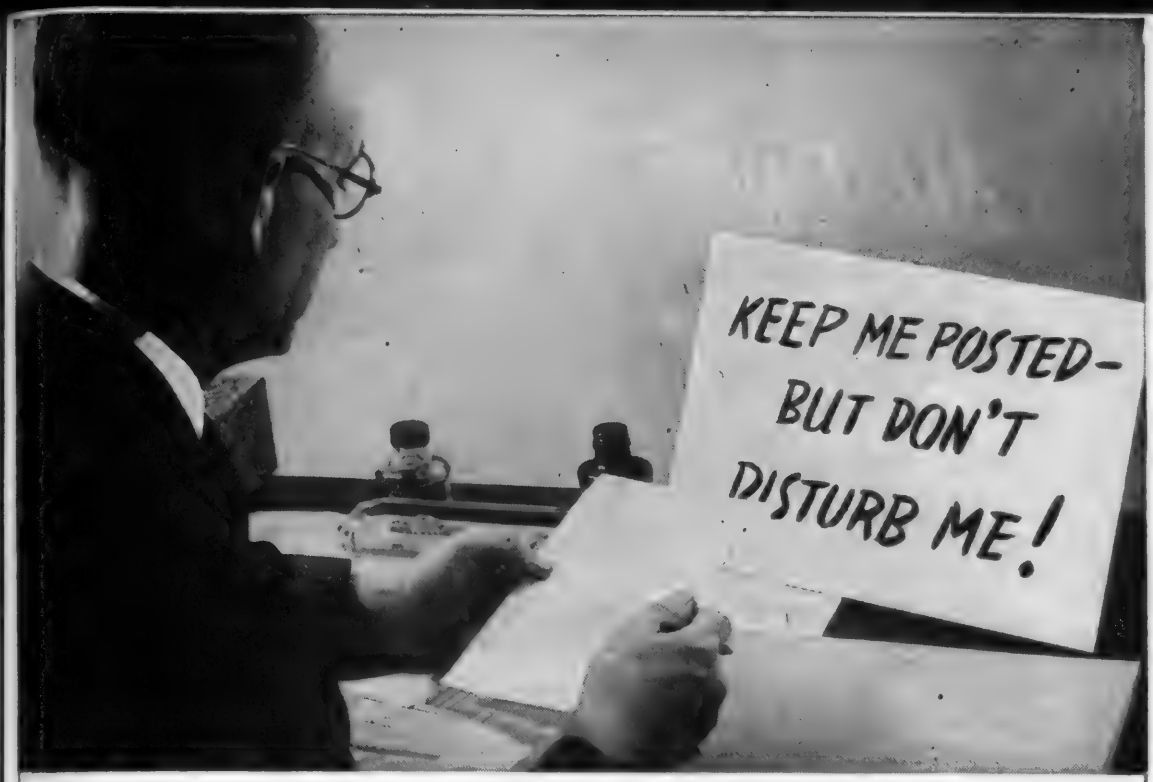
Head Office: 1 Albemarle Street, Piccadilly, London, W.1

Telephone: Regent 8171

ECKERSALL ROAD
BIRMINGHAM 30

Telephone: Kings Norton 2031


THE END
CORROSION
"LITHCOTE" spells death to corrosion due to acid attack on metals. Put an end to your troubles by the installation of Vessels lined with "LITHCOTE" or by re-lining your existing Equipment with
"LITHCOTE"
Proved in Practice Improved by Research
AN "ENSECOTE" PRODUCT
Ask for Brochures and send all Enquiries in the United Kingdom and Ireland to
NEWTON CHAMBERS
& CO LTD THORNCLIFFE Nr SHEFFIELD
LONDON OFFICE ARTILLERY HOUSE, ARTILLERY ROW S.W.1



No doubt, like ourselves, you are keeping your head down to an immediate war-job and have little time for anything else. Nevertheless it is essential to keep in touch with developments likely to affect post-war business; few industries will remain unaffected by the rapid progress of Aluminium alloys during the hush-hush years. It is important that you should know about it. If you would care to write to us we will let you know if and how Aluminium can play an important part in your particular post-war affairs.

We can give you FACTS about Aluminium

NORTHERN ALUMINIUM COMPANY LTD., BANBURY, OXON. **Makers of NORAL Products**

We cannot supply the live variety of seal, even if there were a demand. But we do justly claim to provide any type of Rubber Seal for the Food Trade. Our experience is long and varied—our qualities guaranteed — our service the best we can offer in wartime.

For Preservation of Purity!

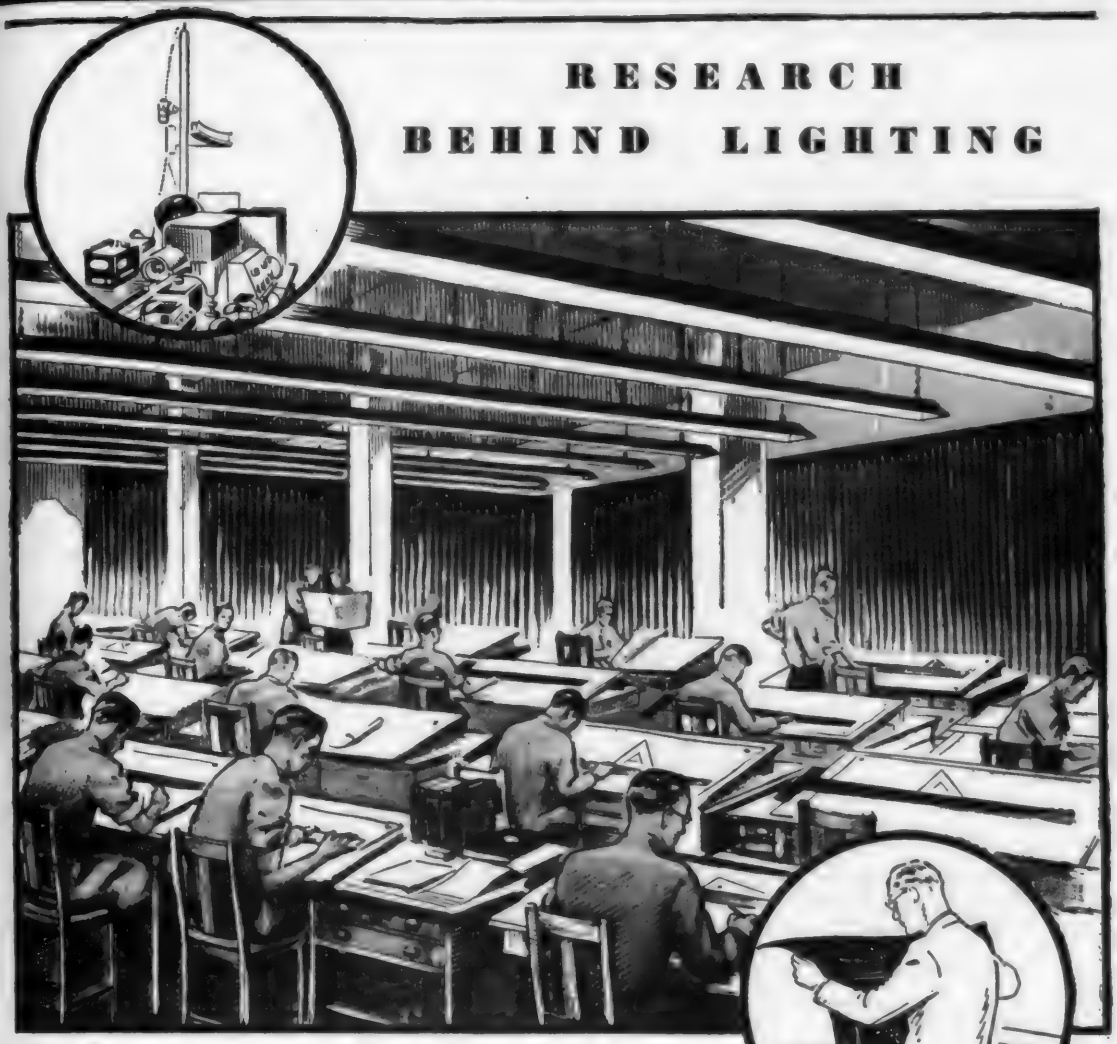
Poppe Rubber Rings are the Perfect Seal

THE POPPE RUBBER & TYRE COMPANY LIMITED

TWICKENHAM **MIDDLESEX**

Telephone: POPESGROVE 2271 (3 lines). Telegrams: POPPE, TWICKENHAM

RESEARCH BEHIND LIGHTING



MEANS TO AN END

TO-DAY there are thousands of factories with lighting conditions approximating to daylight: factories where perfect visibility has reduced sickness and accident to negligible proportions.

BTH Lighting Engineers have made this vital contribution to health and efficiency ; but they, in their turn, have been briefed by BTH Research.

It is, perhaps, a far cry from the BTH Spectro Radiometer to the massive lighting installation of a great factory. Nevertheless, the Spectro Radiometer, in common with many other scientific instruments in the BTH Laboratories, has been a most important means to the designed end.

MAZDA LAMPS

LIGHTING ADVISORY SERVICE

The British Thomson-Houston Co. Ltd., Crown House, Aldwych, London, W.C.2

M4039

——but if she worked in a wartime factory she would also love the good lighting without which she could not keep up her high rate of output.

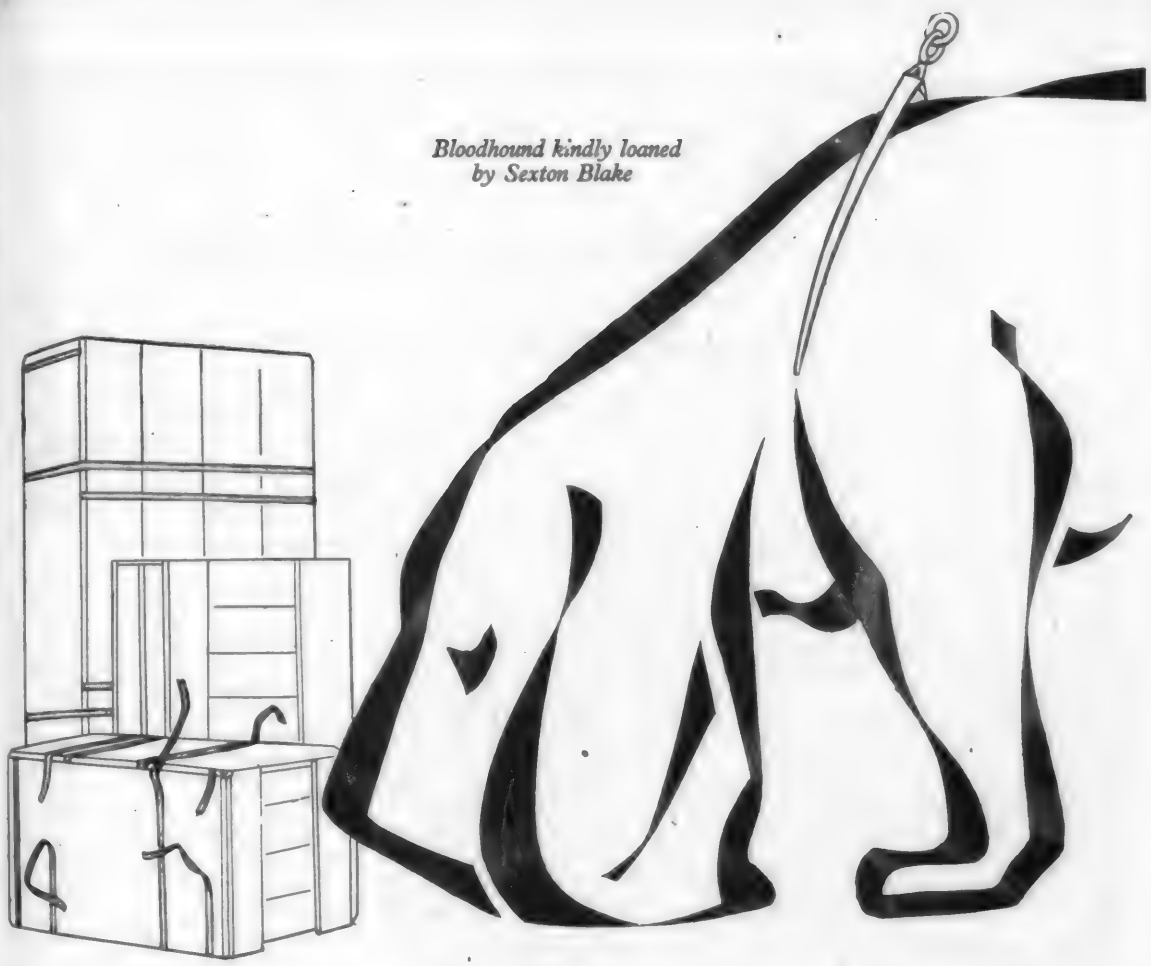
Incorrect lighting is a drag upon workers' health and dulls enthusiasm, whilst correct lighting promotes increased production. If your installation needs better planning or changes are required to take care of new processes, or extensions are necessary—consult the G.E.C.

Take advantage of the knowledge G.E.C. lighting specialists have gained in helping wartime factories towards full production.

Consult the G.E.C.

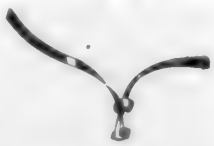
FOR ANY STANDARD OF ILLUMINATION

Advt. of The General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. I.E.17



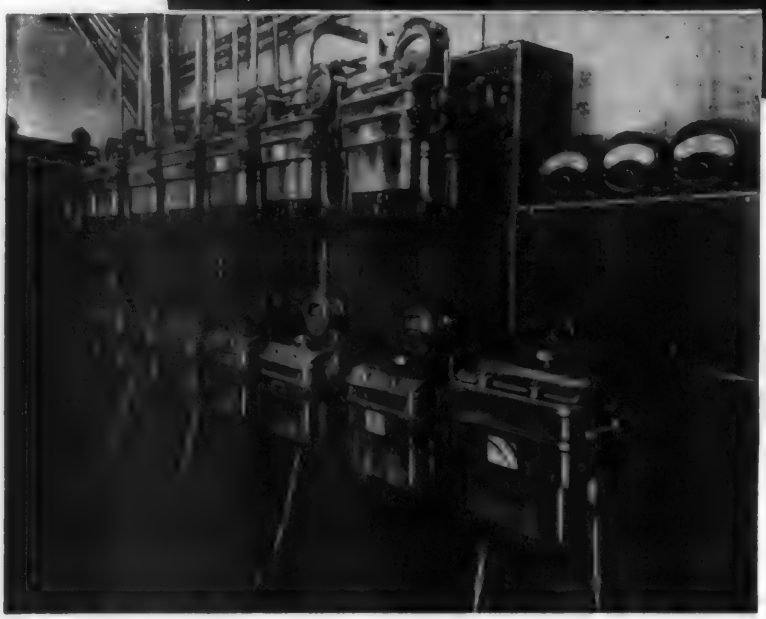
Bloodhound kindly loaned by Sexton Blake

"ELEMENTARY—my dear Sherlock!" *In a perfect world we could no doubt send buckets of diamonds on long journeys and not even trouble to count them before and after. But, alas, the world is still imperfect. Pilferage of goods in transit is a fact, and an ugly fact, that has to be faced. Thieves are ingenious. They can open a case, take what they want and then close the case to look safe and sound. Unless . . . Ha! . . . unless it's bound with Seal-less Strapping. They can cut the strapping of course* ***but they can't fix it up again.*** *The thief who opens a Seal-less Strapped case leaves a clue that even Dr. Watson couldn't overlook.*



SEAL-LESS STRAPPING LTD. 19 SOUTHWARK STREET, LONDON S.E.1. TELEPHONE HOP 1661-2

ELLISON 660 VOLT Distribution Switchboards SAVE VALUABLE FLOOR SPACE...

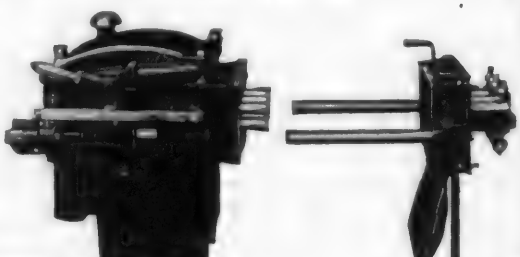


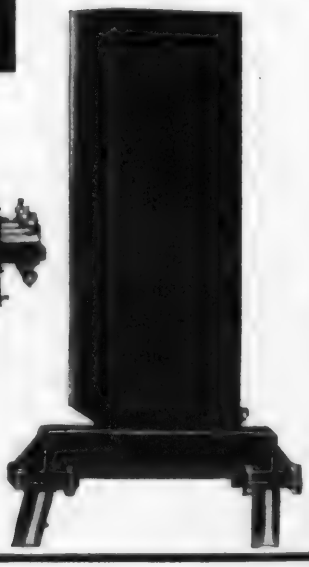
Ellison distribution switchboards have drawout circuit breakers closely grouped together. Breakers of up to 2,000 amps can be included in the same switchboard—the smaller sizes being mounted in tiers to save floor space. Breakers can be purchased separately for engineers to fit to their own switchboards.

ABOVE: Ellison Distribution Switchboard with circuit breakers mounted in two tiers.

RIGHT: An extended view of a drawout Circuit Breaker.

Write for Descriptive List No. 166





GEORGE ELLISON LIMITED BIRMINGHAM 22 ENGLAND

493

Where Steam Flies throng

Steam Flies may not appear to be a serious nuisance, but when it is remembered how fast they multiply, then the threat of contamination and destruction to the nation's food supplies is immediately apparent.

The nation-wide Pest-Control Service operated by Chelsea Insecticides, Ltd., has made a special study of beetles, cockroaches, and steam flies; and their operators not only quickly establish control over them, but keep premises entrusted to their care under observation at regular intervals to guard against re-infestation.

Proprietors of hotels, restaurants, licensed premises, canteens, and bakeries, superintendents of hospitals, schools, hostels, and institutions, in fact, all responsible for premises where food is prepared or stored can have those premises brought under control without inconvenience to themselves by the Chelsea Insecticides Service.

SERVICE ONLY. NO PREPARATIONS FOR SALE

CHELSEA INSECTICIDES *Service*

Chelsea Insecticides, Ltd.,
125 Pall Mall, London, S.W.1
Phone: ABBey 7650

A District Surveyor will call on request to advise on any problem of insect infestation. Sign and post Coupon now.

Name.....

Address .....

F.M.

Fruits of Victory!

The tide of Victory is surely turning our way—and who can blame the housewife if she should be guilty of a little day dreaming?

She looks forward to the day when her man will be wrestling with the weeds in the garden instead of the enemy in Europe, and to the welcome return of the little luxuries in life that mean so much to her and her children.

Tinned Fruit, Fish and Vegetables will play their part in the post-war as never before, and Holdens will be ready, in peace as in war, to provide all canneries with guaranteed preservation by the use of their now famous range of food lacquers—"Super Zinnatine" for fruits, "Sulfatine" for vegetables and meats, and "Zinnatine Marina" for fish.

Meanwhile for war-time jobs on blackplate and for general purpose work there is No. 1736 Deep Stamping Gold.

ARTHUR HOLDEN & SONS LTD.

The Pioneer Lacquer Manufacturers BIRMINGHAM.

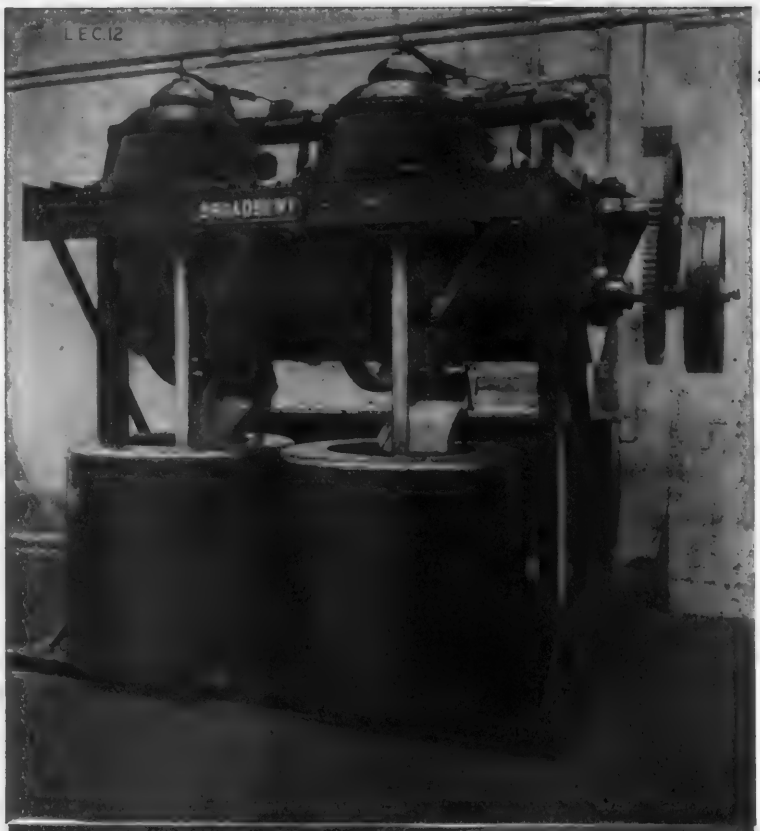
With Inside Knowledge

Above : A Butterfield Craftsman (Diogenes up-to-date in rubber soled shoes) polishing down the welding on a Stainless Steel Road Tank, to give the required "mirror finish."

of the Food Industry's requirements, Butterfields manufacture Road Transport Tanks for the safest, most direct, most economical method of carrying Liquid Foodstuffs such as Glucose, Milk, Fruit Juices, Edible Oils, etc. If nature of contents demands it, insulation is provided to ensure consistent temperature. Easy loading and discharge are other good features. Butterfields produce these robust Road Tanks in single, double, or triple compartment types, as required, up to full legal capacity.

Butterfields
ENGINEERS · SHIPLEY

W. P. BUTTERFIELD LTD.
Head Office : Shipley, Yorks.
Telephone: Shipley 851 (5 lines)
London: Africa House, Kingsway, W.C.2
Telephone: HOLborn 1449
AND BRANCHES



BROADBENT

HIGH SPEED

CENTRIFUGALS

FOR

DRYING, SEPARATING
OR FILTERING

MANY KINDS OF

FOOD PRODUCTS

30" by 18" Water-driven Centrifugals complete with Mixer, Etc.

30" Motor-driven, Semi-continuous Inclined Spindle Centrifugal.

Full Particulars and Catalogue Post Free on Request.

THOMAS

BROADBENT & SONS LTD.

HUDDERSFIELD

Telephone:
5520 (6 lines)
HUDDERSFIELD

Telegrams:
BROADBENT
HUDDERSFIELD

The SARCO Thermostatic BLENDER

for { MIXING HOT & COLD WATER
HEATING SYSTEMS
COOLING CIRCUITS

SARCO Blender serving Flannel Washer.

SARCO Blender filling Food Boiling Pans.

SARCO Blender supplying blended water to Process Vat.

The Sarco Blender is a simple, sturdy and compact assembly of a three-way valve with a Sarco self-acting Thermostat. No auxiliary power is needed . . . It automatically mixes hot and cold water, brine or other liquid and delivers the mixture at any predetermined constant temperature, from 0° to 300° F. . . . Available in sizes up to 6" with rated capacities ranging up to 10,000 gallons per hour.

SARCO CONTROL

SARCO THERMOSTATS LTD. ALPHA HOUSE, CHELTENHAM, GLOS.

Just that little something . . .

WHICH GIVES THE RIGHT FLAVOUR—

PROTEX

Concentrated Protein Extract with high Amino Acid Content

Sole Manufacturers:

FRED[K]. BOEHM LTD.

ROWANHURST, GROVE ROAD, BEACONSFIELD, BUCKS

Telephone: Beaconsfield 378

BUILD IT—SOONER—WITH A STEEL-FRAME

The British Steelwork Association, Westminster, London, S.W 1

IN THE HEART OF THE WEST COUNTRY — **ISLE OF ATHELNEY**

Container History . . .

In all England there was in ancient time no land more remote, more shrouded in legend, more closely guarded by deep bog and reedy mere than the Isle of Athelney. Here in the country of Alfred, that legendary burner of cakes, flourished the craft of the osier weaver.

Athelney in its withy marshes is no longer an island, but it remains the curiously isolated centre of England's oldest craft, where to-day the most ancient of container materials is fashioned to play its part in the conveyance of the world's goods.

Less than ten miles away the most modern of container materials " Cellophane " Cellulose Film—in many ways paralleling the qualities of the resilient withy—is made. It is processed in a wide range of varying types and substances, technically designed to meet the individual wrapping needs of manufacturers and distributors of pre-packed goods in most fields of trade.

One of its outstanding features is defined in the accompanying panel.

Cellophane
REGISTERED TRADE MARK
CELLULOSE FILM

No. 4 OF A SERIES OF FILM DATA PANELS

EXTENSIBILITY

THE MAXIMUM ELONGATION OF DRY " CELLOPHANE " CELLULOSE FILM IS ABOUT 20% BUT NOT MUCH OF THIS EXTENSION OCCURS UNTIL THE BREAKING LOAD IS APPROACHED. AN EXTENSIBILITY UP TO 60% CAN BE OBTAINED WITH FILM OF HIGH MOISTURE CONTENT AND SPECIAL FLEXIBLE FILMS ARE AVAILABLE.

Under normal loads " Cellophane " film shows only slight extension and for this reason does not cause trouble in converting.

With a load of about half that required for breaking the extension is only 2 or 3%. With the moisture content of film increased up to the saturation point the extensibility progressively increases to 60% or more.

Special grades of film are available where extensibility is a necessary part of the specification, and highly flexible " Cellophane " film is used with success in the manufacture of leak-proof flexible petrol piping. Special extensible film is weaker than normal but can be distorted considerably to give a close fit.

Extensibility along the grain is always less than that across the grain, and this property is used in wrapping objects such as biscuits which are known to expand more in one direction than another as they pick up moisture.

BRITISH CELLOPHANE LTD., BATH ROAD, BRIDGWATER, SOMERSET and at LONDON, MANCHESTER, GLASGOW

The same supplies-

- safe in the same containers

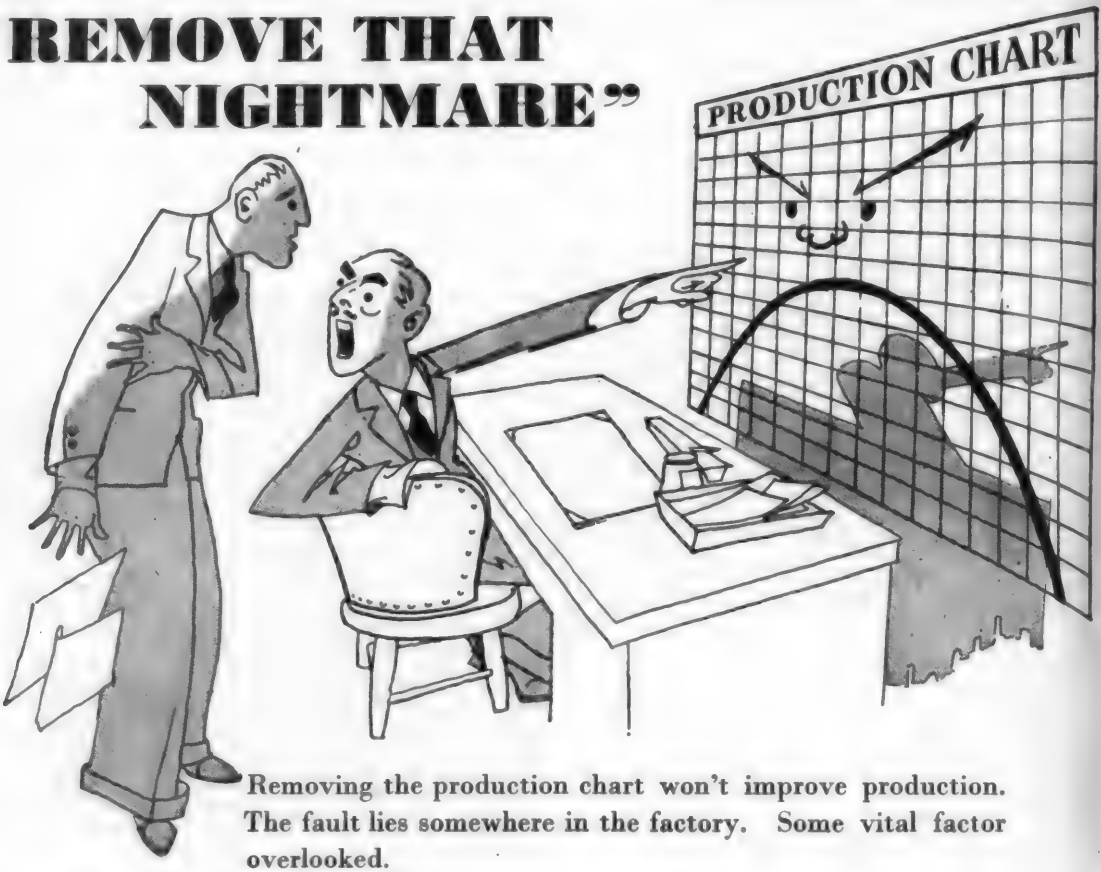
- but standing up to very different conditions!

Medway Corrugated Cases are today doing a vital war job. Hundreds of thousands of tons of essential supplies are being delivered safely in this form of packing. And the sound reputation they achieved in the days of peace has been enhanced by the way they are standing up to the greater hazards of wartime transport. For safety—Medway—every time!

MEDWAY
CORRUGATED CASES

The Medway Corrugated Paper Co. Ltd., Larkfield, Nr. Maidstone, Kent.
London Sales Office: Blackfriars House, New Bridge Street, London, E.C.4.

"REMOVE THAT NIGHTMARE"



Removing the production chart won't improve production. The fault lies somewhere in the factory. Some vital factor overlooked.

Perhaps it is bad ventilation.

Unless an efficient ventilation system is installed excessive heat and bad ventilation will retard production. Workers' energy will be sapped, enthusiasm damped and increased production made impossible.

Not only will an efficient system of ventilation help to increase war-time production but it will add immeasurably to health and output in the post-war years too.

VENTILATION IS A VITAL FACTOR THAT WILL MAKE OR MAR ANY PRODUCTION CHART — SO CONSULT THE G.E.C. WHOSE VENTILATION ENGINEERS GIVE EXPERT ADVICE ON EQUIPMENT ESPECIALLY DESIGNED FOR INDUSTRIAL VENTILATION.

VENTILATION by GENALEX FANS

CONSULT THE G.E.C. ON VENTILATION

with GENALEX EXHAUST FANS

Advt. of the General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2 Gen. 17

SCIENCE WITH PRACTICE

Established 1833

A Still Room at our Wharf Road Works

Realistic Flavours—With many of the essential oils normally used for flavouring unobtainable, or in drastically short supply, manufacturers' problems tend to become acute. We cannot pretend always to solve them, but we can offer you our vast accumulated experience and the service of our experts in producing something to meet your special requirements. It has often been through such service that leading firms have learnt to rely on—

StaffAllenS

STAFFORD ALLEN & SONS, LTD., WHARF ROAD, LONDON, N.1

TAS/AL.191A

WHITE, TOMKINS & COURAGE LTD.

Can now offer limited supplies of

REIGATE

Pure Essence of Parsley

Prepared entirely from freshly cut parsley specially grown for them on local farms

For Samples and Prices write :

WHITE, TOMKINS & COURAGE LTD.

REIGATE · SURREY *Phone : 2242*

She also serves . . .

The monotony and fatigue of repetition work call for great powers of endurance. Everything humanly possible has been, and is being done, to alleviate the lot of those so unselfishly working long hours in our great war factories.

In this connection, one of the greatest contributory factors to comfort and the reduction of the fatigue ratio has been the installation of Tan-Sad Chairs.

Tan-Sad "Silver King" Chairs are built on a new principle of seat suspension, which with the swivelling backrest provides for freedom of movement and the maximum comfort for the individual.

Supplies are available for factories engaged on essential work. Full details on application.

The TAN-SAD CHAIR COMPANY (1931) LTD

14 AVERY HOUSE, CLERKENWELL GREEN, LONDON, E.C.1

TELEPHONE: CLERKENWELL 3192

A&W

Increase in Manucol Supplies

Production having been stepped up, it is now possible to meet the increased demand for this pure form of sodium alginate. High and low viscosity grades, known as Manucol IV and Manucol I respectively are being manufactured.

Full information and samples will be sent on request

A&W

Albright and Wilson Ltd.

Oldbury · Birmingham

A&W

Manucol

sodium alginate—

may be used for

Stabilising emulsions and suspensions

Thickening solutions

Setting in jelly form

Coating solids with films

A&W

Mice too are a MENACE

● Despite their less obnoxious appearance mice can be as destructive of food stocks and essential war materials as rats. For this reason the menace of mice should promptly be brought under control.

● The British Ratin Company will help with your particular problem. The Company offers a nation-wide service, based on scientific and well-tested principles, by surveyors and operators highly skilled in the destruction of rats and mice.

To guard against re-invasion of premises where infestation has once been brought under control, the Ratin Service includes provision for careful inspection at regulated intervals.

RATIN SERVICE

NO PREPARATIONS FOR SALE. SERVICE ONLY

Please ask your Surveyor to call and explain how the Ratin Service deals with rats and mice.

FILL IN COUPON AND POST TO-DAY

THE BRITISH RATIN CO., LTD. 125 PALL MALL, LONDON, S.W.1

Telephone: ABBey 7621

Name .....

Address .....

Date of Appointment ..... Time .....

F.M.

SKYLINE SCANDAL tells its story

A FACTORY SKYLINE decorated with puffs and plumes of steam. What dark story does it tell?

That there's plenty of room for steam saving?

That the management don't understand the real value of steam?

That they have coal to spare?

A steamy skyline and steam-shrouded workshops may mean all these things.

What can be done about it?

PUT IT TO WORK

Exhaust steam from engines and pumps; flash steam from trap discharges; vapour from process vat and machines—if any is wasted, *coal is wasted;* if any is saved, *coal is saved.*

Skyline steam is every bit as good (often better) for some jobs than live steam from the boilers. In every lb. of it there is little less heat than in steam leaving the boilers at 100 lbs. or 200 lbs. pressure.

That heat can and *should* be put to work. Every puff used is that much live steam saved. *The Fuel Efficiency Bulletins offered below will tell you how to use it. Please send the request form.*

Placed at the disposal of the Ministry of Fuel and Power by Spirax Manufacturing Co. Ltd., Cheltenham, Glos., as a contribution to the national campaign for greater fuel economy.

MAKE A CLEAN SWEEP OF YOUR SKYLINE AND PUT THE STEAM TO USEFUL WORK

FREE BULLETINS OF STEAM-SAVING IDEAS

To the MINISTRY OF FUEL & POWER (Fuel Efficiency Branch),
2 Little Smith Street, Westminster, London, S.W. 1.

Please send, without charge, the bulletins marked with a tick:

....THE SENSIBLE USE OF LATENT HEAT (*How large steam economies can be made by the simplest of re-arrangements*).

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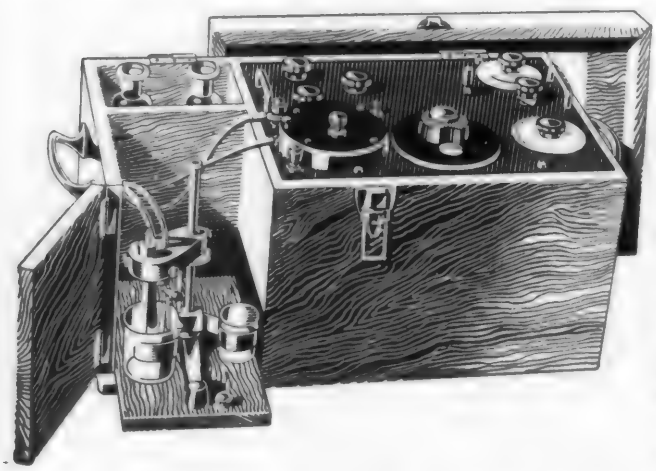

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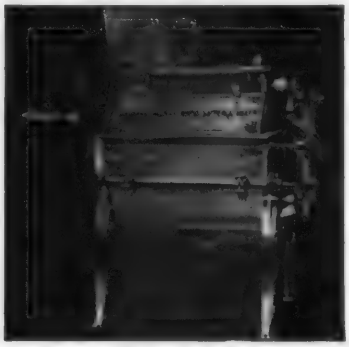

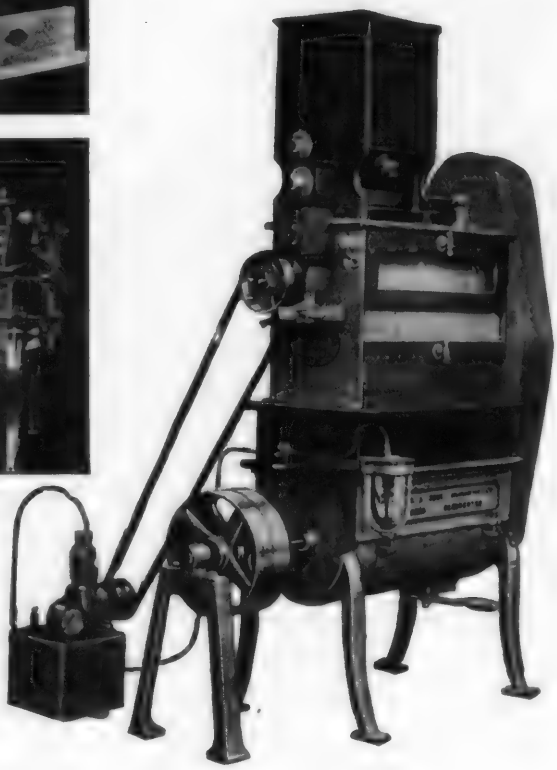

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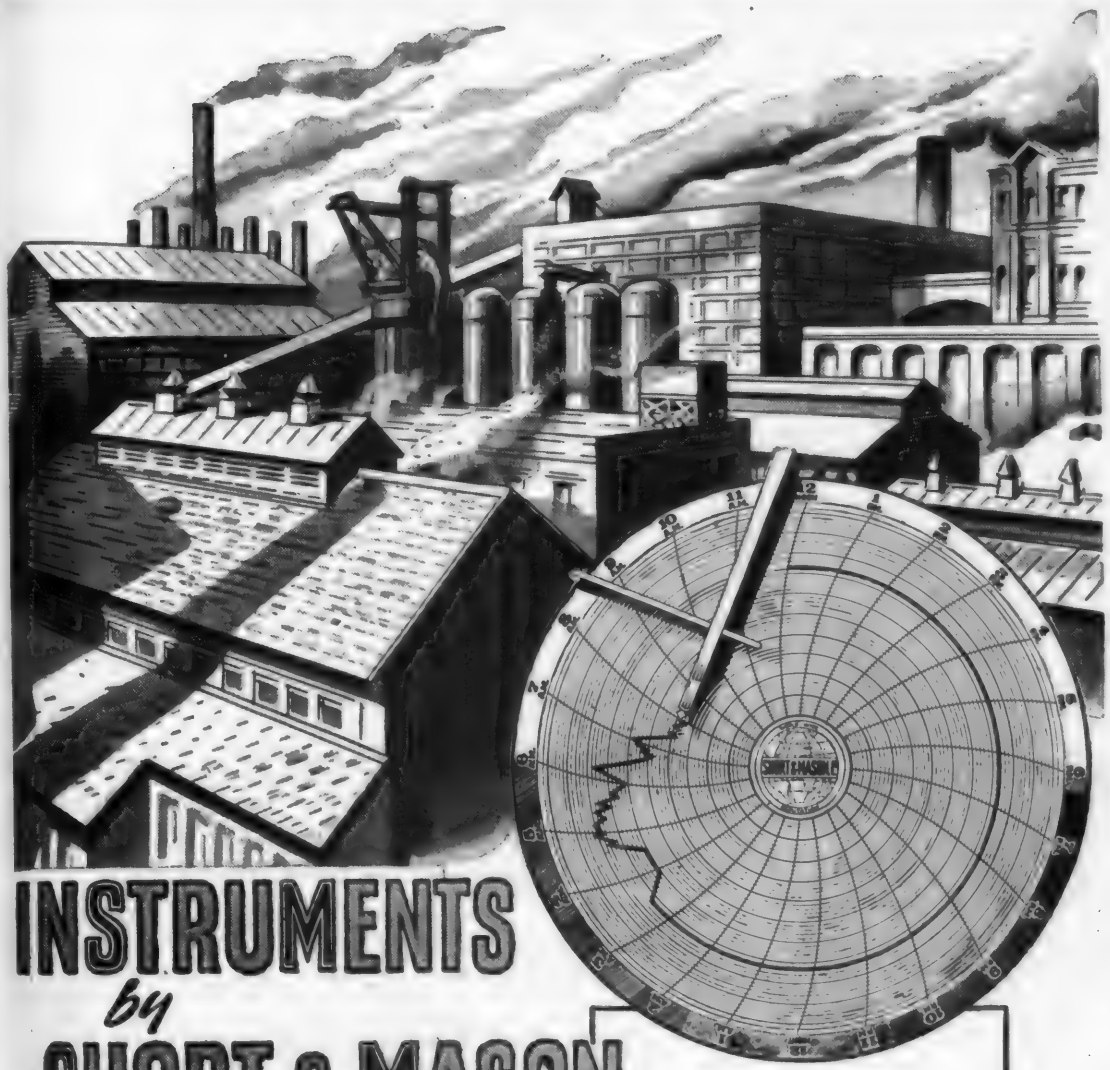

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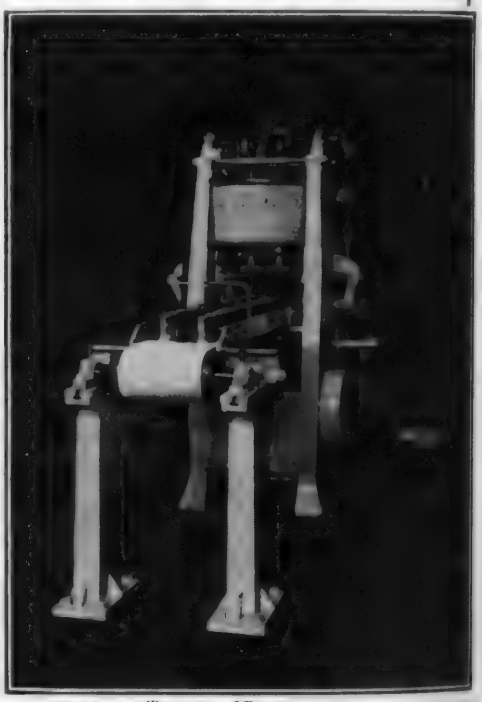

Illustration of Twin-Head Filler

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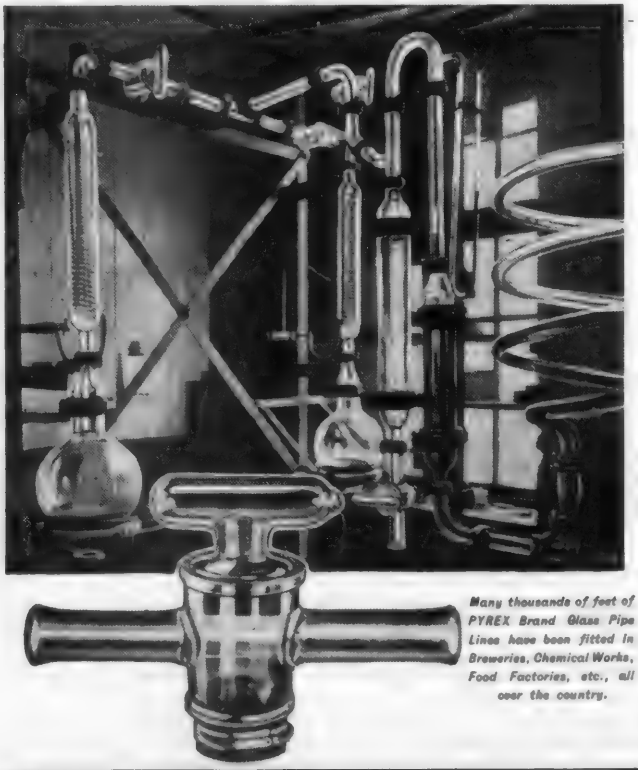

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WHEN the history of the 20th century comes to be written, it will be seen that during the two wars industry completely changed its fundamental ideas and policy. In this series will be examined some of the more pregnant forces underlying this change. Today the subject is PENSIONS.

THE coming decades will pose increasing problems for old age. Responsibility for the superannuated is shifting rapidly from the family to Industry and the State. Retirement is coming at an earlier age than previously. In agriculture, the handicrafts and the keeping of small shops, the process of retiring can be gradual and adjusted to the weakening faculties of the individual, but as our economy becomes more complex, and organised in larger and less flexible units, with more narrowly specialised occupations, we tend to become employed fully or not at all. It is difficult to find a place for the person who fails to keep the general pace.

The rapid increase in the numbers of the aged—in 1970 for every man and woman now over 65 there will be two—will magnify the problem, so that in view of the growing agreement that dependent members of our society shall be provided with at least a minimum of economic security, pensions must be expected to grow enormously. The man and woman who has played and worked hard deserves more than mere thanks at the retiring age and should not be denied the means of existence in the shape of an adequate pension.

Our final years should be happy, care-free and graced by the esteem of our fellows, but already there is evidence that old people are losing social status. This must not be. The family customs of the past gave a prestige that is disappearing. Parental and particularly patriarchal controls are being weakened by geographical mobility and the diminution of those fixed ties of property that accompany an agrarian economy. Old age is even losing its scarcity value. Let us therefore cheerfully shoulder the burden of adequate pensions in the era of peace that lies ahead, for happiness is divisible and is to be shared by giver and receiver alike.

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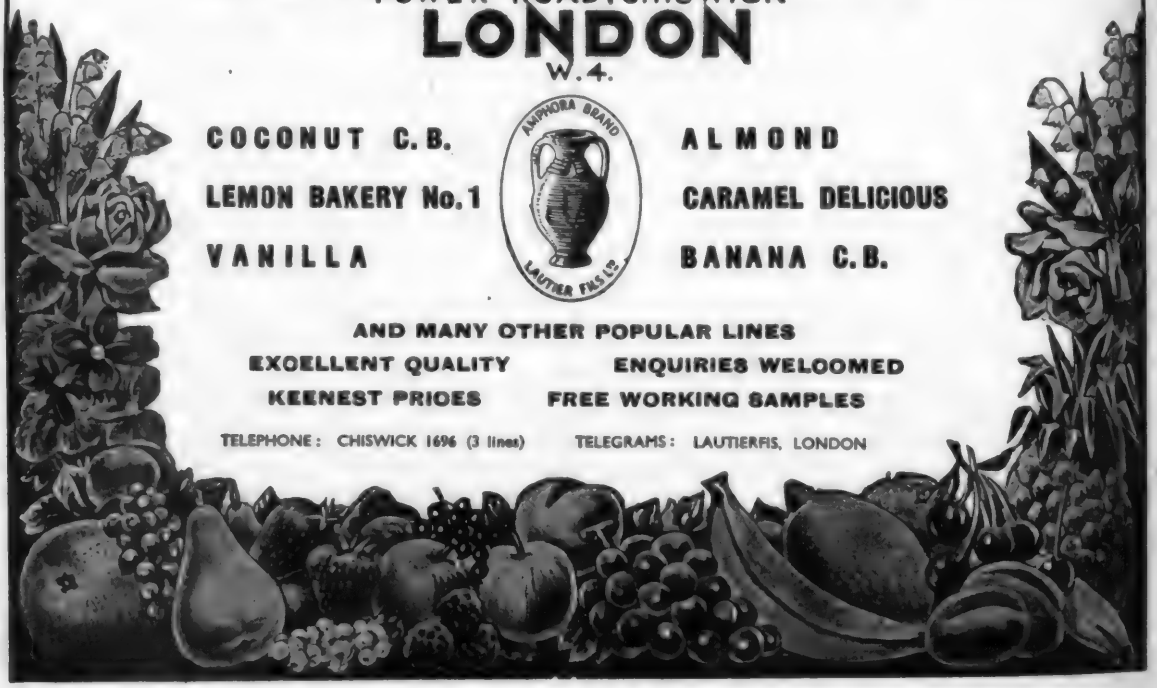

Simple Installation + High Working Pressure
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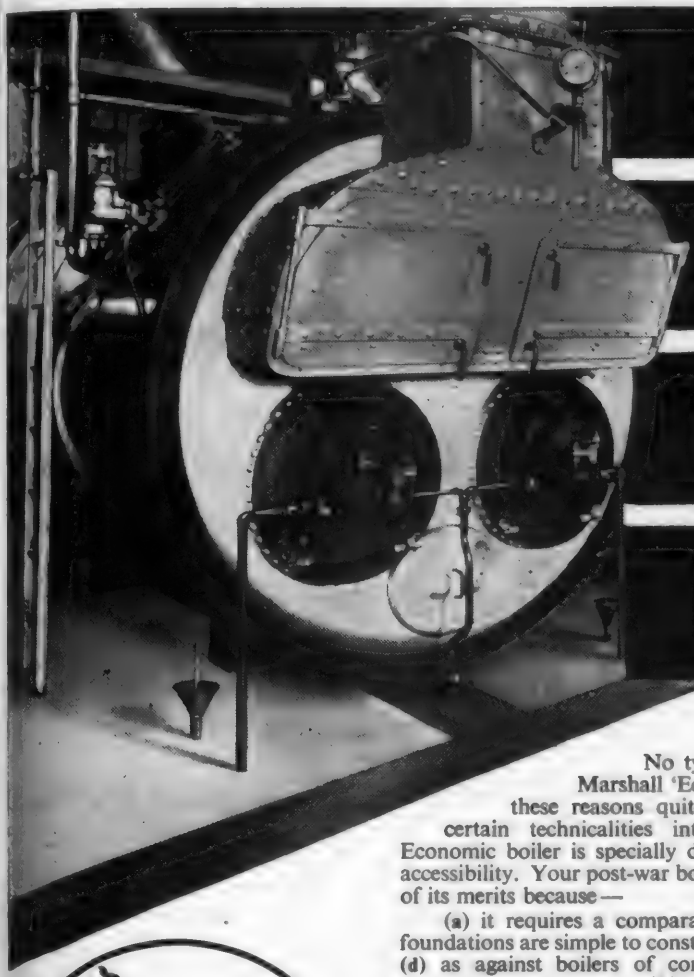

1. Evaporation — the quantity of water a boiler will turn into steam in one hour.

2. Working Pressure — the pressure in lbs. per square inch at which steam is generated.

3. Efficiency — the amount of heat going into the water divided by the total heat available in fuel.

4. B.T.U'S — British Thermal Unit (the heat unit used in this country). One pound of good coal contains 13,500 B.T.U'S.

No type of boiler can enjoy the popularity of the Marshall 'Economic' without good reason. And to make these reasons quite clear to you we include notes translating certain technicalities into non-technical language. The Marshall Economic boiler is specially designed for simplicity in installation and easy accessibility. Your post-war boiler buying plans should include consideration of its merits because—

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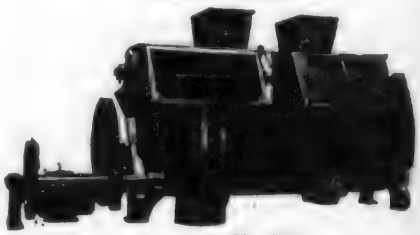

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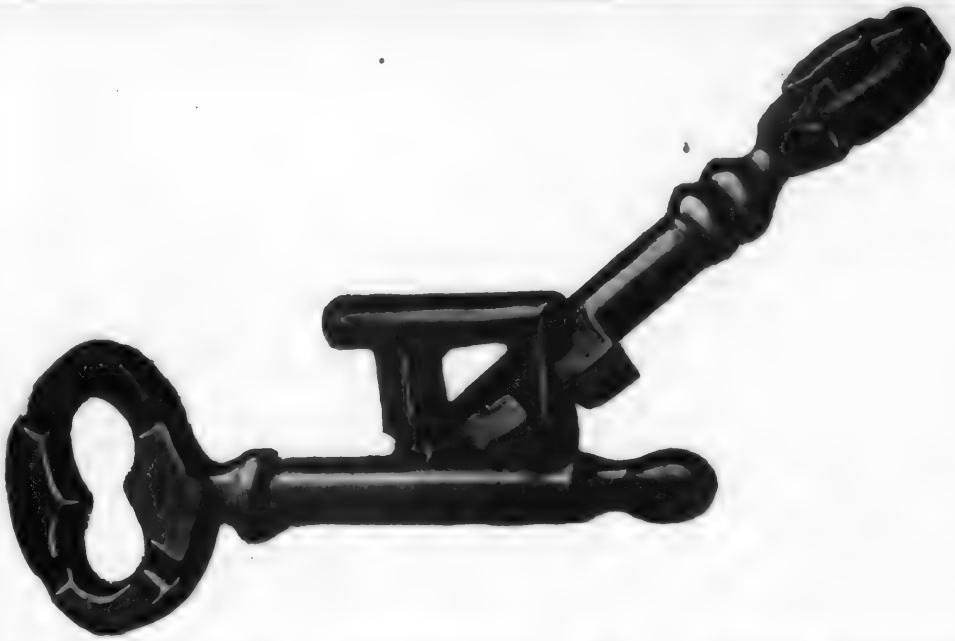

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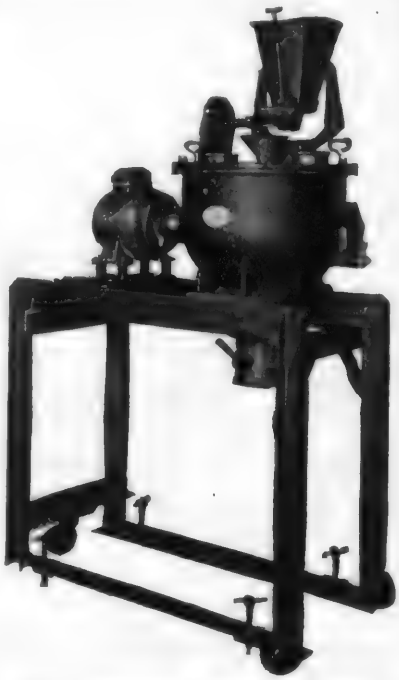

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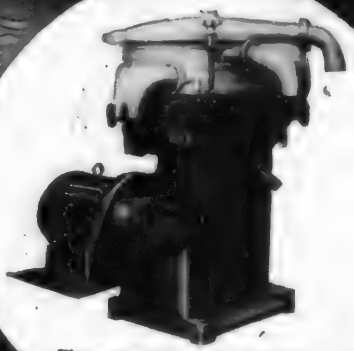

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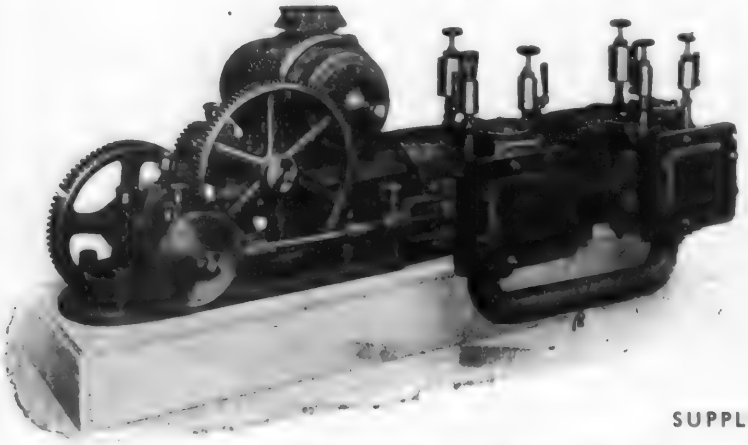

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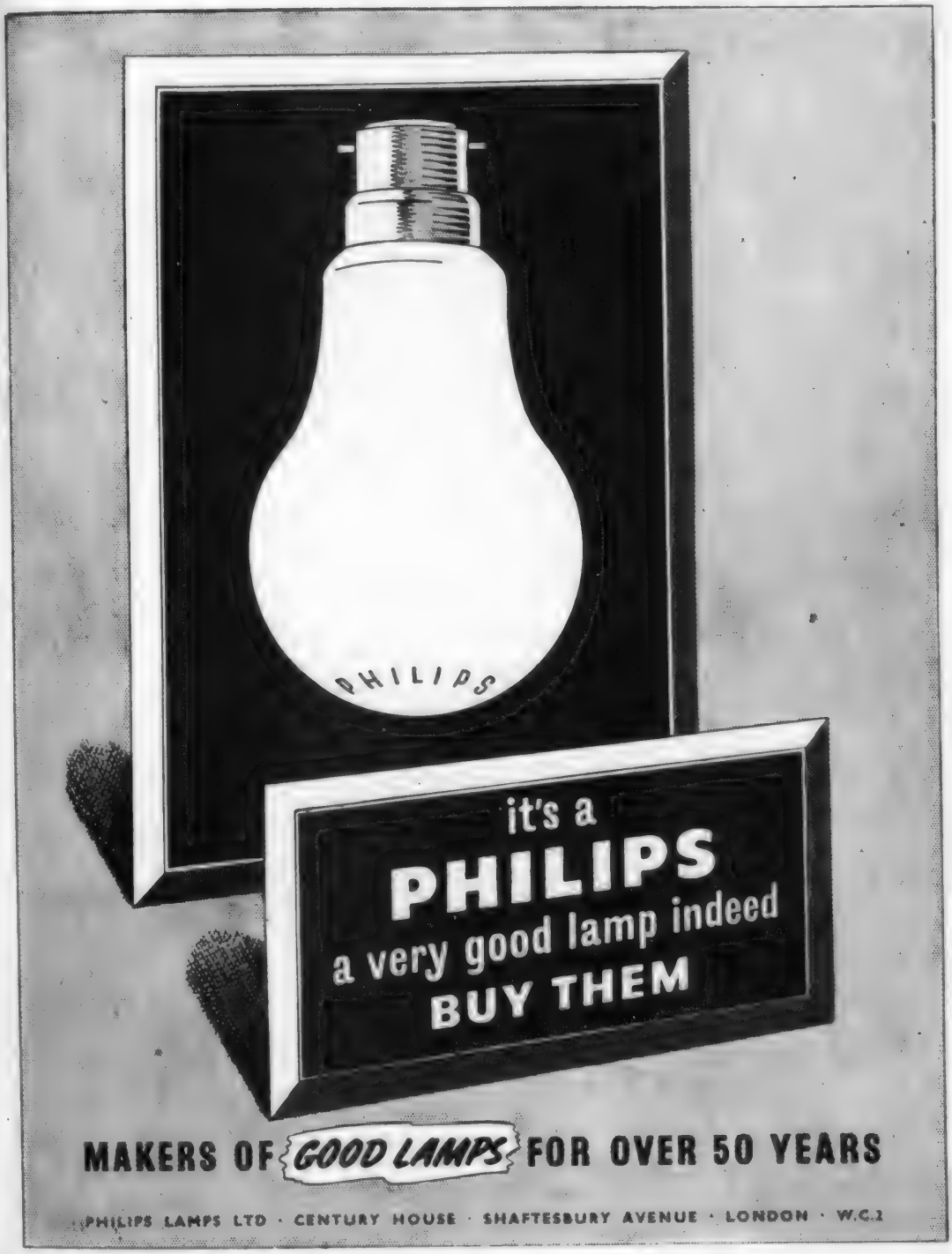
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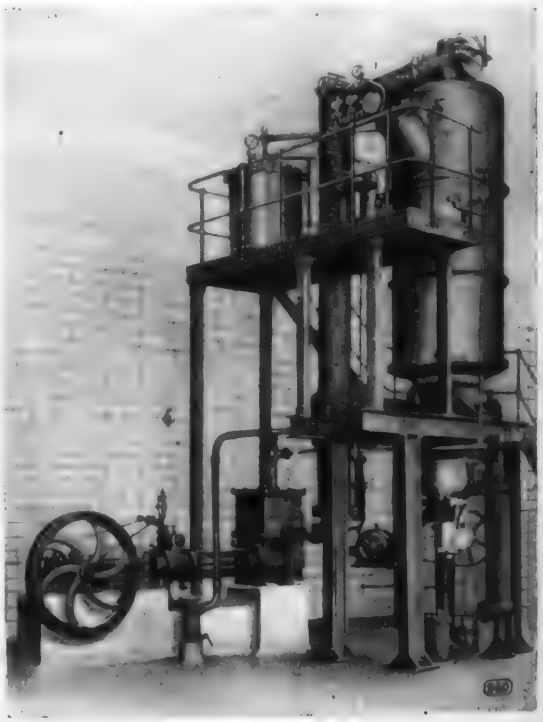

Illustration shows forced circulation stainless steel vacuum evaporator for milk.

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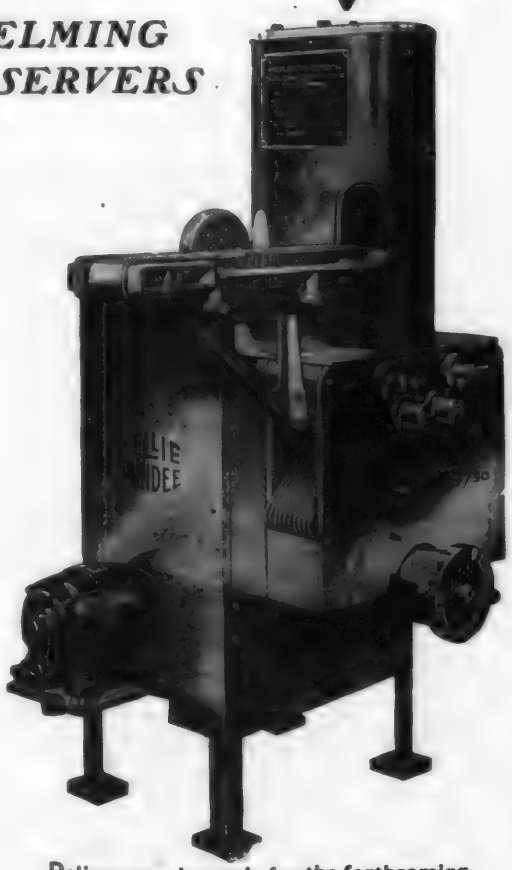

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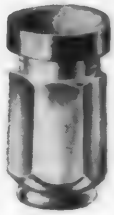

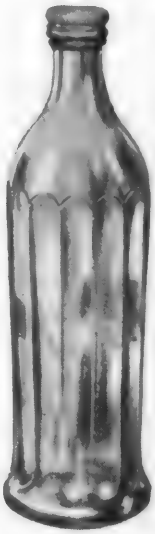

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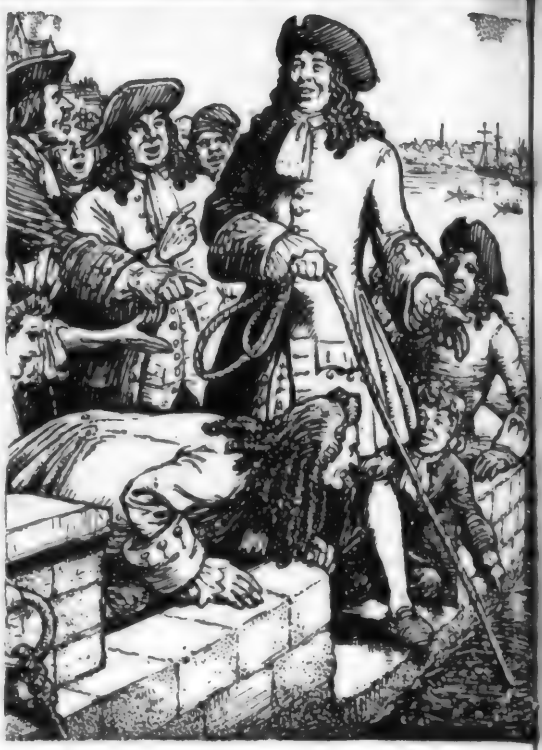

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1706

In 1706 a Mr. James Austin of London proved that, if you didn't mind the mess, you could cook a pudding by enclosing it, complete with tin pan, in a sack of lime and submerging it in the Thames for two or three hours. One way to do a job of cooking, certainly, but not a very practical one!

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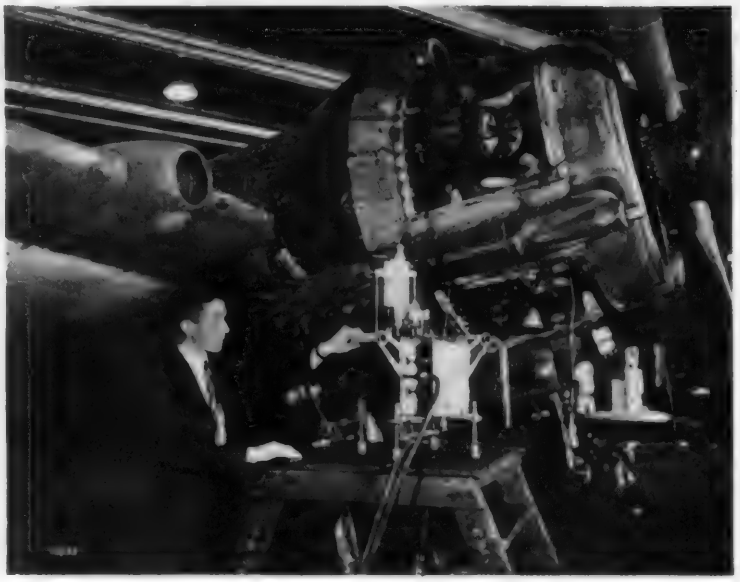

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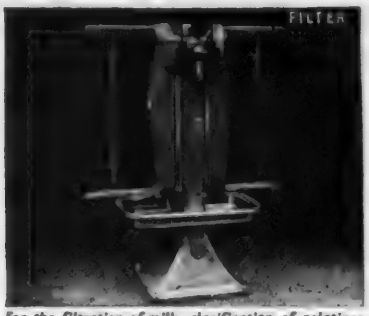
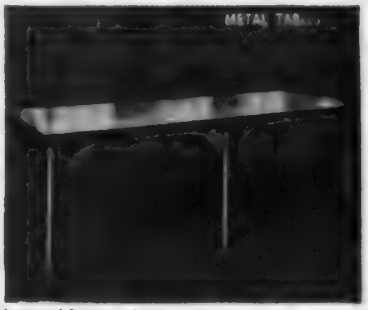


For the filtration of milk, clarification of gelatines and similar purposes. **Leaflet 184.**

For boiling jams, meats, soups, sauces, etc. In aluminium, stainless steel, nickel and monel, for various steam pressures. Smooth welded interiors. **Leaflet 213**

For boiling jams, meats, soups, sauces, etc. In aluminium, stainless steel, nickel and monel, for various steam pressures. Smooth welded interiors. **Leaflet 213.**



Legs and framework of cast aluminium. Top of steel plate covered with stainless steel or nickel. Extremely handsome and robust. **Leaflet 151.**

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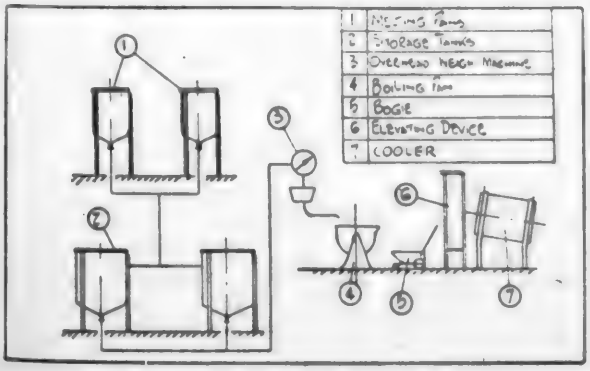

● Examples of standard A.P.V. Food Plant are shown on this page. In addition A.P.V. construct all-welded plant in Aluminium, Stainless Steel, Monel and Nickel to special designs produced in collaboration with clients Factory layout schemes for efficient and economic production prepared by experts.

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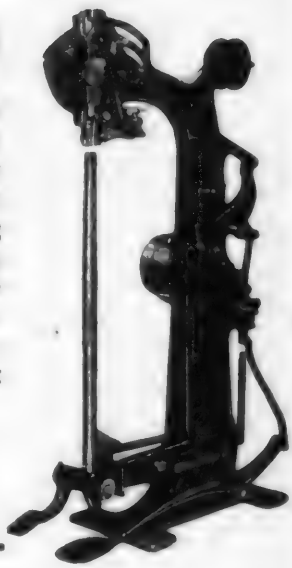

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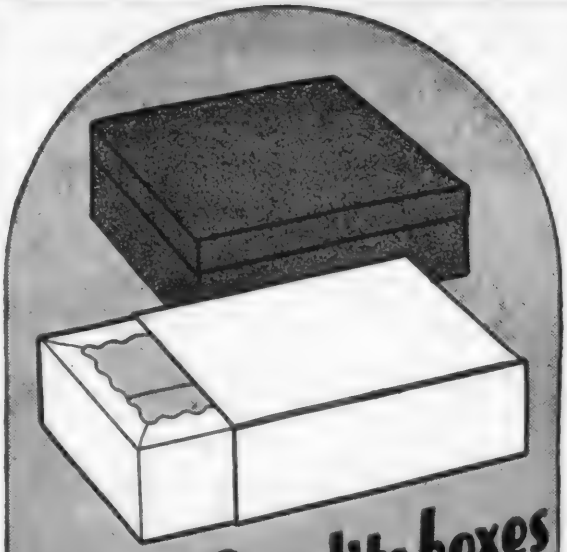

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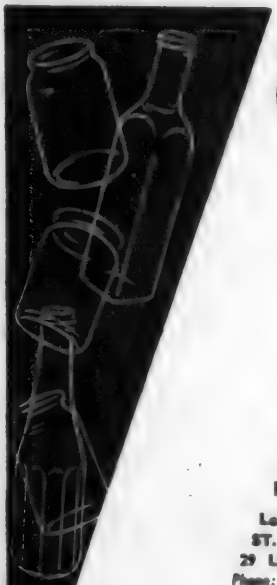

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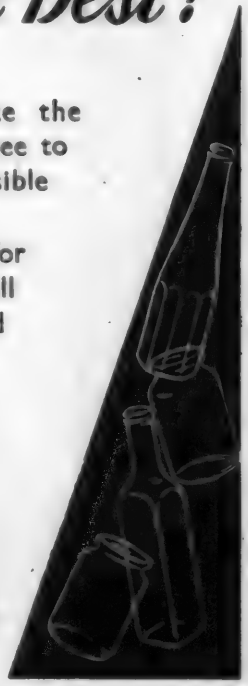

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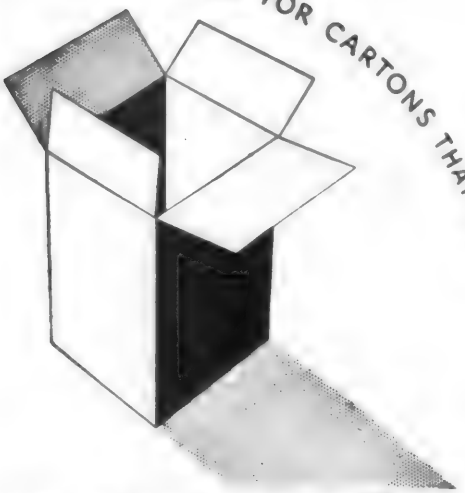

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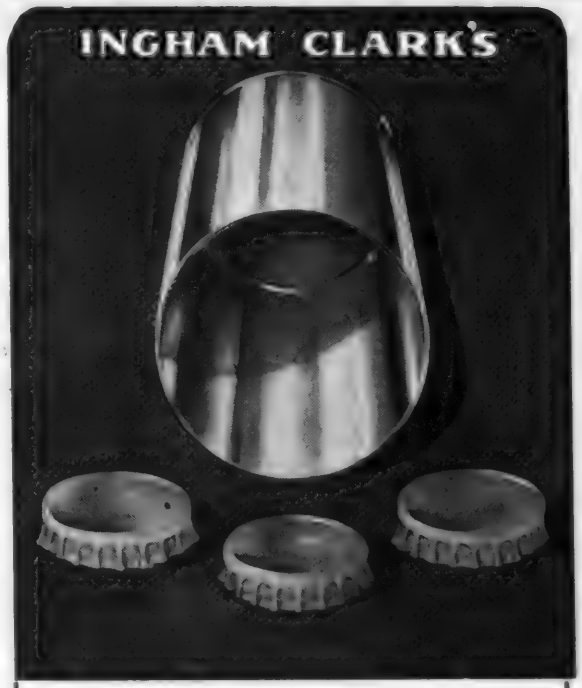

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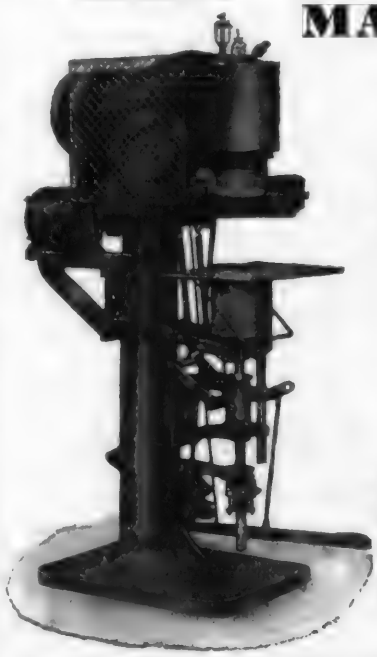

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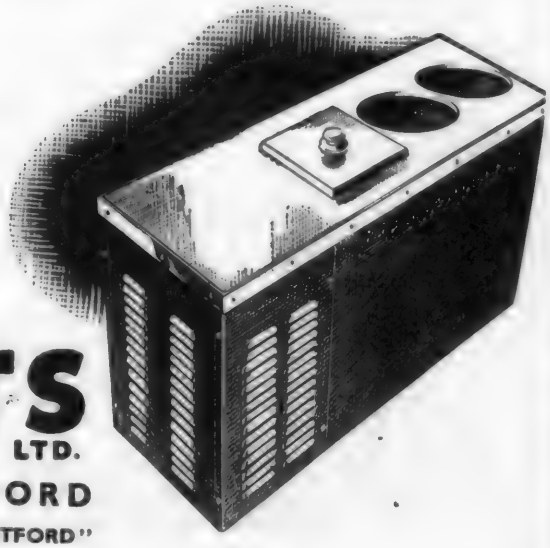

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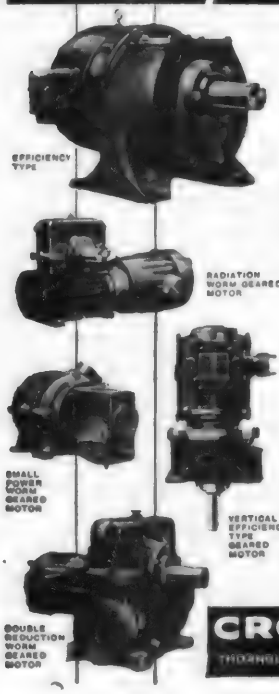
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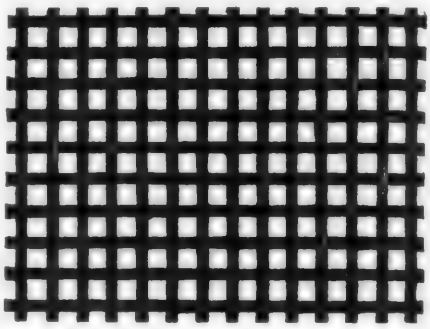

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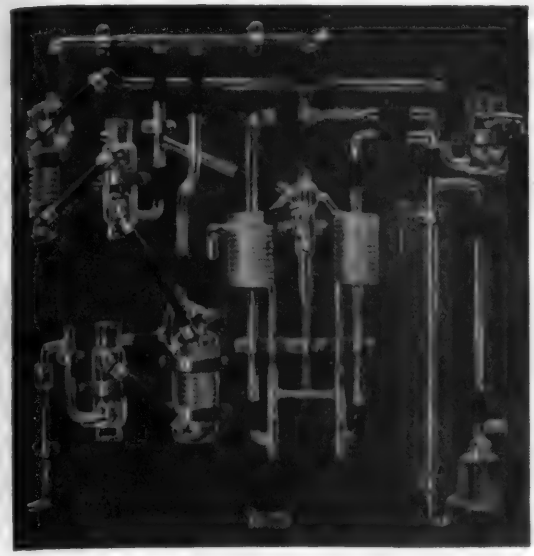

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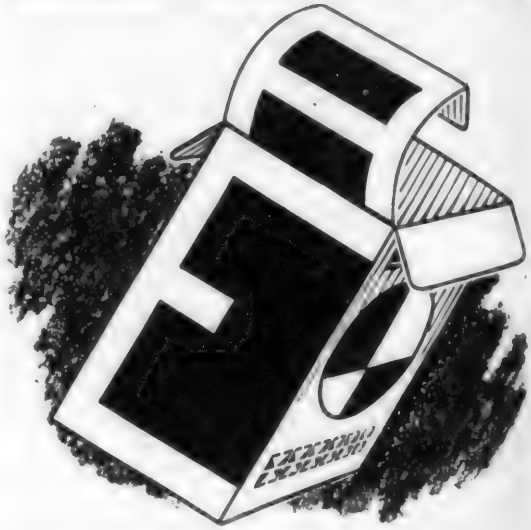

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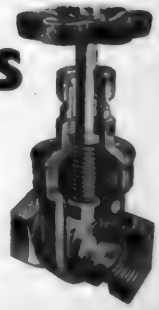

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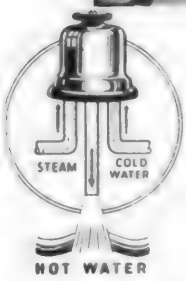

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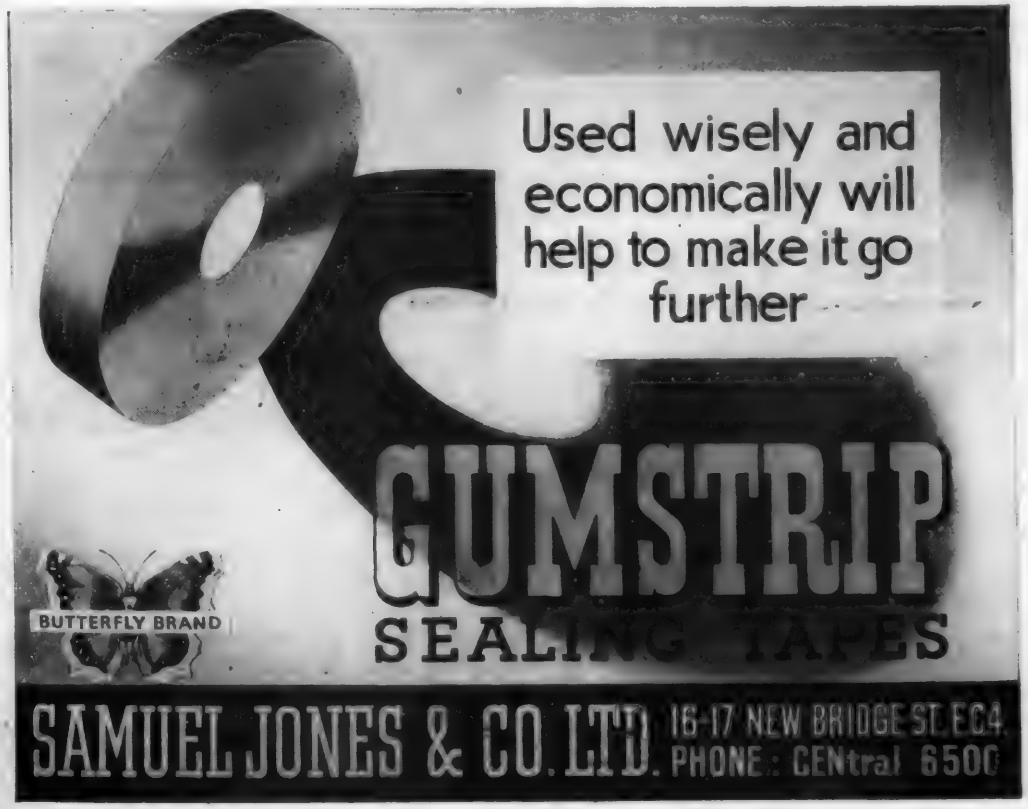
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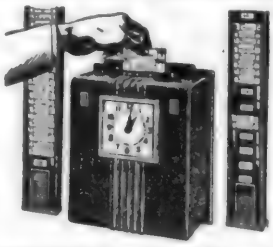

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VACANCY for Works Manager for Food Factory. Must have held similar position, and be accustomed to having complete charge of all labour. Good opportunity for a really capable man. Commencing salary of not less than £650 per annum.—Write, in confidence, giving details of age, experience, and position held during last five years to the General Manager, Unicream Limited, Broughton Lane, Manchester 7.

WANTED, an Assistant Chemist for a food factory in East London. Applicants should be of E.R.I.C. or equivalent standard or approaching same. Some experience of Food Chemistry and technology an advantage. Favourable prospects of ultimate advancement to a person of enterprise.—Apply Box B908.

IN preparation for post-war development. Firm engaged in the manufacture and distribution of various products for the grocery trade would like to contact a gentleman with sound experience in development and production of additional lines. The position involves a definite knowledge of food chemistry also of factory management and costings and will carry an interesting salary to a really highly skilled and progressive specialist. Utmost confidence observed, but applications must state fully age, qualifications, experience and salary required. Firm's employees already acquainted.—Box 798, Dorlands, 18-20, Regent St., London, S.W.1.

MANAGER, to take charge of Engineering Department, required by large Food Manufacturers in Scotland. Applicants must be fully Qualified Engineers capable of controlling all maintenance work and be responsible for installation of new plant. Lay-out and D.O. experience essential. Ability to initiate experimental engineering work on new processes is very important. Age not exceeding 40. Post is permanent and pensionable. Applicants should apply for Form of Questionnaire to Box 279, Robertson and Scott, Edinburgh 2.

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Replies to BOX Numbers should be addressed to *Food Manufacture*, 17, Stratford Place, W.1.

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WORKS Engineer required to take charge of maintenance and new installation of plant for firm of Food Manufacturers. Position offers good prospects with ample scope for initiative and enterprise. Salary according to qualifications and experience.—Write, giving fullest details to Box B897.

WANTED, Senior Assistant Chemist for Food Laboratory near London. Experience in analysis of milk products essential. Knowledge of bacteriology an advantage. Preference will be given to applicants with experience in the manufacture of milk products.—Apply giving full particulars and stating salary required to Box B894.

SITUATIONS WANTED

ADVERTISER seeks position as Factory Manager. Long experience in processing and packing of Powdered Foods, including Self-Raising and Household Flours, Custard and Blanc-mange Powders, Jelly Crystals, Spices and Herbs, and in the manufacture of Table Jellies, Sauces, Soups, and Food Products associated with the Grocery and Allied Trades.—Box B895.

FACTORY and Production Manager requires post; 27 years' practical experience in the manufacture of Sausages, Luncheon, Canned Brawn, Briskets, Chicken and Ham Roll, Jellied Veal, Pressed Pork, Liver Sausage, Black Pudding, Jelly and Piping decorations, Preparing and Pickling meat. Own recipes seasonings. A thorough practical knowledge of factory management, organisation and control of labour. Can fit and open up factory.—Box B921.

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FOOD Chemist, British, 34, good honours degree, experienced in research, who has studied food from soil to stomach, desires post in food industry. Experience in plant control, bacteriology, vitamin work, dehydration. Good French, German, reads Russian. Hard working.—Box B918.

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WANTED, Partnership or Managership in Canning or Jam factory. Some capital. Long practical experience. Write in strict confidence.—Box B893.

ADVERTISER wishes to acquire Custard Powder and Blancmange manufacturing concern.—Write details Box M.13334, Haddon's, Salisbury Square, London, E.C.4.

OLD-ESTABLISHED food manufacturing company wishes to acquire a small Canning Plant and Factory. Situated food and vegetable-growing market preferred.—Write details Box M.13335, Haddon's, Salisbury Square, E.C.4.

TO Manufacturers not already exporting. We export all class of merchandise and if you have anything to offer for prompt or for postwar, kindly contact us. We pay in London: carry our own credits abroad: and attend to shipping. Please write to Box B898.

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ADVERTISER desires to acquire a manufacturing concern for Pickles and Sauces.—Write details to Box M.13364, Haddon's, Salisbury Square, Fleet Street, E.C.4.

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REQUIRED to purchase immediately, small fruit-preserving factory with plant of capacity 1,000 tons jam and bottled fruit per annum.—Answer to Box B919.

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WANTED, small Food Manufacturing concern producing under licence Bakers' Curd, Filling Cream, Marshmallow, etc., or lines associated with the Bakery and Confectionery Trades. If desired advertiser would be prepared to take financial interest in a company and to extend to it the full benefit of his existing manufacturing, buying and sales organisation.—Box B886.

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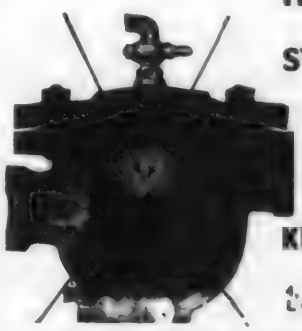

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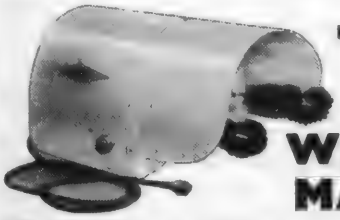

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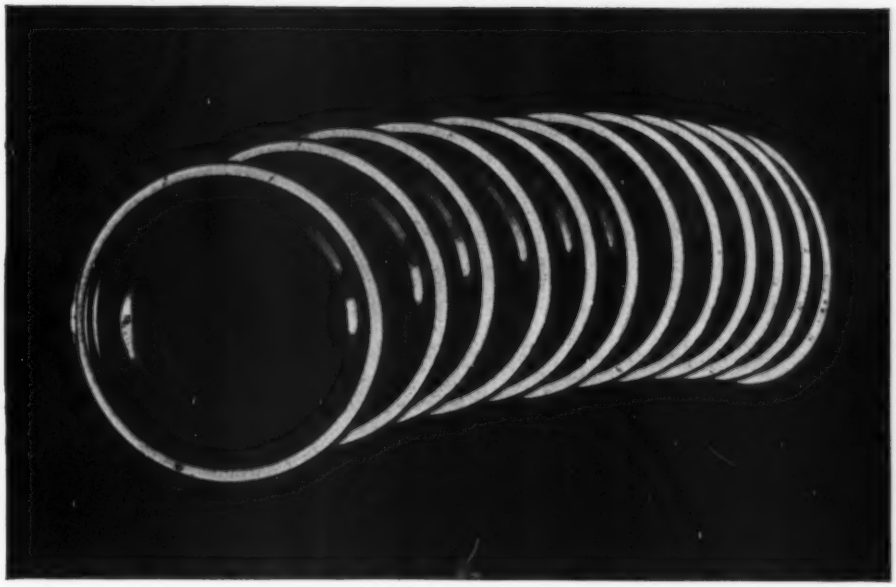

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